FISHERIES
RESOURCE
CONSERVATION
COUNCIL

# "UNCHARTED WATERS"

## ANNUAL REPORT OF THE FISHERIES RESOURCE CONSERVATION COUNCIL AND CONSERVATION REQUIREMENTS FOR ATLANTIC GROUNDFISH STOCKS FOR 2000

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# LETTER TO THE MINISTER

Honourable Herb Dhaliwal
Minister of Fisheries and Oceans
200 Kent St.
Ottawa, Ontario
K1A 0E6

Dear Minister:

I have the honour to present to you the annual report of the Fisheries Resource Conservation Council (FRCC) for 1999/2000. This report provides a summary of the work of the Council, including our conservation requirements for Atlantic and Eastern Arctic groundfish stocks for 2000/2001.

We have titled our report *Uncharted Waters*. This is a forecast of our future course. In the coming years, we will work with stakeholders to develop long-term Fisheries Resource Conservation Plans for Atlantic Canadian groundfish stocks. This has never been attempted before, and we will be "charting new waters" in this endeavour. It is our hope that by developing long-term objectives for groundfish resources, we can then develop annual advice which will achieve those objectives.

We thank you for the opportunity you have provided us to make a contribution to the betterment of the Atlantic groundfish fishery.

Fred Woodman
Chairman

# CHAPTER 1: CHAIRMAN'S REPORT

# CHAPTER 1: CHAIRMAN'S REPORT

The year 1999/2000 was one of significant change for the Fisheries Resource Conservation Council (FRCC).

## THE COUNCIL'S MEMBERSHIP

In 1999/2000, after a period in the previous year when more than 50% of the Council's membership changed, the membership composition of the Council was stable. In December 1999, the Minister of Fisheries and Oceans thanked Mr. Trevor Taylor for having served on the Council for over six years. In January 2000, the Minister appointed Mr. William Broderick, a fisherman from St. Brendan's, Newfoundland to the Council for a term of three years.

## THE COUNCIL'S ORGANIZATION

The most fundamental event to occur within the Council during the year was its decision to abolish the three Committees which had served the Council well almost since its inception, with a view to forming Teams dedicated to pursuing an ecosystemic approach to the work of the Council. Drawn broadly from the three large geographic areas of Canada's Atlantic coast, the Council constituted 3 Ecosystem Teams with responsibilities for stocks of the Eastern Arctic and off Newfoundland and Labrador, stocks of the Gulf of St. Lawrence, and stocks of the Scotian Shelf, the Bay of Fundy and Georges Bank. Given the diverse geographic and biological characteristics of the redfish stocks in Atlantic Canada, the Council has also created a Redfish Team.

Building on the Council's 1997 Conservation Framework for Atlantic Groundfish, the Ecosystem Teams will synthesize information from scientists and from industry stakeholders through discussion and consultation with the goal of developing Fisheries Resource Conservation Plans for stocks within their respective ecosystems.

The Council believes that through the development of such long-term plans for each stock, in consultation with all stakeholders, it may be possible to achieve a consensus on long-term conservation objectives, and focus on short-term measures to achieve these objectives. Buy-in to these long-term objectives from all stakeholders, and in particular from the harvesting sector, will make them achievable. Without meaningful conservation practices, the Council doubts that the true potential of Atlantic Canadian groundfish resources will ever be achieved.

## COUNCIL MEETINGS

The Council held seven meetings in 1999/2000.

### Brudenell, Prince Edward Island – July 28 – 29, 1999

This meeting focussed on finalizing the Council's advice for the 2000 fishing season for groundfish stocks managed by NAFO.

### Moncton, New Brunswick – October 5 – 6, 1999

At this meeting, the Council abolished the Committee structure under which it had operated, and agreed to reform itself along 3 broad ecosystem groups, covering:

NAFO Subarea 0, and 2+3

Areas 4RST

Area 4VWX5Yz

### Ottawa, Ontario – December 8 – 10, 1999

This meeting focussed on finalizing the Council's advice for the 2000/2001 fishing season for groundfish stocks on the Scotian Shelf and in the Bay of Fundy (4VWX), in Sub-Areas 0, 2+3, and for redfish stocks.

### Halifax, Nova Scotia – February 9 –11, 2000

The focus of this meeting was to define the operations of the ecosystem teams whose creation was approved in October 1999. The Council formed four teams:

Northern Team

Gulf of St. Lawrence Team

Southern Team

Redfish Team

These Teams form the working groups of the Council, and report back to the full Council on all matters.

### Halifax, Nova Scotia – March 23 – 24, 2000

This meeting focussed on finalizing the Council's advice for the 2000/2001 fishing season for groundfish stocks in the Gulf of St. Lawrence.

### Halifax, Nova Scotia – May 10 – 12, 2000

This meeting focussed on finalizing the Council's advice for the 2000/2001 fishing season for groundfish stocks on Georges Bank, and for cod in 2J3KL.

### Halifax, Nova Scotia – June 19 - 21, 2000

This meeting focussed on discussions with the staff of the Department of Fisheries and Oceans concerning the development of long-term plans for groundfish stocks.

## CONSULTATIONS

The Council met with stakeholders throughout 1999/2000, and held 19 formal stakeholder consultation sessions attended by almost two thousand fishermen:

### NAFO Stocks

St. John's, NF June 22, 1999

### Stocks in 0, 2+3

Deer Lake, NF November 22, 1999
Harbour Breton, NF November 23, 1999
Gander, NF November 24, 1999
Clarenville, NF November 25, 1999

### Stocks on the Scotian Shelf and in the Bay of Fundy

Sydney, NS November 30, 1999
Shelburne, NS December 1, 1999
Halifax, NS December 2, 1999

### Redfish Stocks

Halifax, NS December 2, 1999

### Gulf of St. Lawrence Stocks

Gaspé, QC March 13, 2000
Port aux Choix, NF March 13, 2000
Port aux Basques, NF March 14, 2000
Moncton, NB March 15, 2000
Blanc Sablon, QC March 15, 2000
Port Hawkesbury, NS March 16, 2000

### Northern Cod

Grand Falls, NF April 18, 2000
Clarenville, NF April 19, 2000
St. John's, NF April 20, 2000

### Georges Bank Stocks

Yarmouth, NS May 9, 1999

The Council also received well over 100 written briefs during the year.

Through consultations, the receipt of written briefs, publication of its reports and the better use of communications, the Council strives to continue the development of meaningful consultation processes.

During 1999/2000, the Council provided 6 reports to the Minister of Fisheries and Oceans:

*"Fisheries in Transition" – Annual Report of the Fisheries Resource Conservation Council and Conservation Requirements for Atlantic Groundfish Stocks for 1999 – July 1999*

*Advice on NAFO-Managed Groundfish Stocks – August 1999 (Published in January 2000)*

*2000 Conservation Requirements for Groundfish Stocks on the Scotian Shelf and in the Bay of Fundy (4VWX), in Sub-Areas 0, 2 + 3 and Redfish Stocks – January 2000*

*FRCC Advice on Atlantic Halibut for 2000/2001 – February 2000*

*2000/2001 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks – April 2000*

*2000/2001 Conservation Requirements for Georges Bank Groundfish Stocks and for 2J3KL Cod – May 2000*

In January 2000, the FRCC also conducted a two-day workshop to discuss the practical application of the Precautionary Approach. Participants were drawn from the FRCC, from industry, and from the Department of Fisheries and Oceans. While the Workshop was not successful in developing a consensus on the application of the Precautionary Approach for redfish stocks, it was instructive for the Council, and many of the issues raised by participants figure prominently in the decision of the Council to pursue the development of Fisheries Resource Conservation Plans for the groundfish stocks within its mandate.

## ISSUES

### LACK OF REBUILDING

The Council was dismayed by the lack of rebuilding which both scientific and industry stakeholders thought was underway in some stocks. In particular, the increasing catch level recommendations for 3Ps cod were too far, too fast. The Council takes its share of the responsibility for these increases; indeed, in its most recent advice for this stock, the Council cautions that stability at this level of catch is likely for 3 – 5 years to maintain the prospects for longer-term rebuilding.

The Council was concerned about the 3Pn4RS and 4X cod stocks, and provided reductions in the recommended TACs as signals of this concern. While other species may be showing stability or slight improvements, the Council is cautious in its approach to these stocks.

The Council was guardedly more optimistic about the 4TVn cod stock: maintaining the TAC at the recommended 6000t level provides this stock with the best chances of continuing the modest rebuilding which seems to be occurring.

## ECONOMIC PRESSURE

Industry overcapacity continues to be the single most significant factor facing the Canadian Atlantic groundfish fishery. The Council has discussed this repeatedly in the past. This overcapacity and the economic structure of the fleets are driving participants to demand higher quotas for stocks that have not shown signs of rebuilding. Pressure on these limited groundfish stocks has continued to increase, perhaps not in terms of numbers of licensed fishermen, but in terms of the technological capacities of the fleet to find and kill fish.

Atlantic Canadian groundfish landings in the 1980s averaged over 750,000t per year. In the period 1995 – 1998, these landings averaged about 125,000t, less than 20% of the landings of the previous decade. While it might be argued that landings in the 1980s were too high and led to the collapse of many groundfish stocks, it should also be argued that the landings of the 1990's were too low, and that healthy groundfish stocks should deliver more yield than they have recently. This is an indication of the depressed state of these stocks.

## DFO SCIENCE CAPACITY

The Council continues to be dismayed about the resource constraints placed upon the scientists of the Department of Fisheries and Oceans. In addition to the financial constraints imposed on them, the Department is facing a demographic challenge: a new generation of scientists and technicians will be important to deliver the Department meeting its mandate.

A word of support: the Council has often been perceived to be critical of the scientists of the Department of Fisheries and Oceans. Our mandate to provide advice on processes and priorities within the Department at times causes us to be constructively critical of the Department. Such constructive criticism should not be confused with our support of the individual scientists working within the Department. They are knowledgeable, dedicated and courageous, and all stakeholders must recognize these characteristics.

## NORTHWEST ATLANTIC FISHERIES ORGANIZATION

The Council is concerned about the multilateral management regime which governs the conservation of stocks managed by the Northwest Atlantic Fisheries Organization. Significantly different management regimes are applied inside and outside the Canadian zone, and the conservation measures applied inside the Canadian zone are much more conservation-oriented than those applied by NAFO in the Regulatory Area. Small fish protocols, larger minimum fish sizes and larger minimum mesh sizes are some examples of measures imposed on Canadian fishermen which are more restrictive than those of NAFO. Such measures must also be applied to all countries fishing these stocks so that no one country unfairly pays for the benefits taken by others. With the depressed condition of many stocks, the Council is disappointed at the failure of NAFO to adopt conservation measures in the NAFO Regulatory Area consistent with those in the Canadian zone.

Many of the stocks managed by NAFO are of significant importance to Canada. Stocks of 3LNO American plaice, 3NO cod, and 3NO witch flounder were fished primarily by Canadians, and have been important in the Atlantic Canadian fishery. The Council is deeply concerned about the increases in by-catches of species under moratoria, especially of 3LNO American plaice and 3NO cod, and about the increasing catches of unregulated species outside the Canadian zone.

## SEALS

Canada's seal population continues to grow. The harp seal population is now numbered at well over 5 million animals. The gray seal population is increasing, and its range is expanding. The size of the seal herds, and their potential impacts on vulnerable groundfish stocks and populations are raised at consultations across Atlantic Canada. The Council is heartened to see that the Minister struck a Panel on Seal Management as was recommended by the Council, and looks forward to the report of the Panel. The Council is still of the opinion that the large numbers of seals are impeding groundfish recovery.

## CONCLUSION

Much emphasis is placed on the Council's catch level (e.g. TAC) recommendations. However, the Council notes that the recommendations which it makes with respect to conservation measures are just as vital to sustainable harvesting as the catch levels. Distribution of effort in space and time, the prevention of the concentration of the fishery on a single year class in a stock, the prevention of fishing on spawning concentrations, the use of a variety of fishing gears, responsible fishing, and other measures which the Council advocates in its reports, when balanced with appropriate levels of catch, are important to the long-term viability of the fishery.

# CHAPTER 2: GROUNDFISH STOCKS ON THE SCOTIAN SHELF AND IN THE BAY OF FUNDY, IN SUB-AREAS 0, 2 + 3, REDFISH STOCKS AND STOCKS IN THE NAFO REGION

# LETTER TO THE MINISTER

January 18, 2000

The Honourable Herb Dhaliwal, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister,

The Fisheries Resource Conservation Council (FRCC) herewith presents to you its report on *2000 Conservation Requirements for Grounfish Stocks on the Scotian Shelf and in the Bay of Fundy (4VWX), in Sub-Areas 0, 2 + 3, and Redfish Stocks*.

This report presents TAC reduction recommendations for many stocks. In no cases has the Council recommended an increase in any TAC. In some cases (e.g. pollock, Unit 2 redfish) these reductions are directional, in that they reflect declines in the status of the stock. In other cases (e.g. 4X cod, 3Ps cod), the reductions are corrective, attempting to get ahead of the declines in those stocks.

The Council is discouraged by the seemingly increasing resource constraints facing DFO Science. While it recognizes that such constraints are not entirely within your control, and are imposed on you by the priorities of the Government of Canada, this situation cannot continue: the health and conservation of groundfish stocks, indeed that of all exploited natural resources, depends on our ability to adequately assess the state of these resources. Currently, this ability is inadequate.

The Council is concerned with respect to declining indicators such as recruitment, length at age, and condition factor for many groundfish stocks. The Council is pleased to note however, that DFO Science and the Fisheries Oceanography Committee will hold a workshop of groundfish recruitment in February: the Council looks forward to the output of this workshop.

In this report, for many stocks, the Council has attempted to better reflect the rationale underlying its recommendations through both a change in format and a change in content. It is our intent to continue this in future reports, in order to allow a more transparent view of our work.

Sincerely,

Fred Woodman

Fred Woodman
Chairman

# INTRODUCTION

## STATE OF INFORMATION

In March of 1999, the Council wrote to the Minister of Fisheries and Oceans:

> *"The Council wishes to draw your attention to the continued erosion of funds allocated to DFO Science for fisheries research. These cuts cause two main problems – reductions in both survey work and in the continuation of longer-term initiatives."*

In May of 1999, the Council provided its advice on 1999 Conservation Requirements for 2J3KL Cod. In that report, the Council noted "*...the data are inadequate as a basis for a scientific assessment and setting of a TAC for this stock*" and "*...a much improved database to work from is a must for future years.*" The Council went on to provide recommendations as to how this might be achieved.

**The FRCC cannot overstate its concerns regarding the impact of Departmental resource constraints on the information which is available to provide conservation advice to the Minister of Fisheries and Oceans.** Some examples of these constraints are:

- A survey for juvenile groundfish on the Scotian Shelf was cancelled in 1998, removing the single most important information source on recruitment to the silver hake stock.
- Northern cod inshore areas were removed from the 1999 survey, despite the Council's May 1999 warning that information on the coastal components of this stock was already severely lacking.
- 3Ps (and other) sentinel surveys have been significantly reduced despite an agreement amongst the Department, industry, indeed all stakeholders, that structured information collected by fishermen is indispensable.
- What is currently the largest Atlantic groundfish stock, Greenland halibut, has not been the subject of a scientific survey in its spawning area in Subareas 0 + 1 since 1986.
- In 1997, the Unit 2 redfish survey was cancelled in 1998, in favour of being conducted every two years. Subsequently, the 1999 survey was cancelled, and now it seems uncertain for 2000. Such a break in the time series cannot be rebuilt. While industry surveys may replace some of this data, the fundamental design of these surveys is as an adjunct to DFO research vessel surveys, and not as a replacement. There is also no guarantee that industry surveys will continue.

This situation is discouraging to the Council, and to industry who have made commendable strides in collecting and collating information – it contributes to a very high level of uncertainty regarding the status of the stocks, at a time when capacity to harvest these stocks is constantly increasing. More powerful vessels, more precise locating devices, and more efficient fishing gears are increasing pressures on resources for which we have increasingly less information. Vessels which traditionally fished only nearshore areas, can now extend their effective range beyond the 200-mile limit.

Since its inception in 1993, the Council's messages have been focussed on expansion of indices, not on the reduction or substitution which is the current situation. Unfortunately, observations regarding this situation have become a recurrent theme of the Council.

## MULTI-YEAR TACs

The Council has attempted various strategies in the past of setting TACs for more than just the year in question, but it has been reluctant to recommend multi-year approaches given both the uncertainties in stock assessments, and that it had not consulted widely with stakeholders on such an approach. Indeed, many stakeholders have recommended this approach to provide increased economic stability.

It is clear for many stocks that recovery to a level to allow sustained directed fishing is well off in the future, and dependent on the confluence of many significant factors. Indeed, many stocks have been the focus of by-catch only restrictions, and it seems unlikely that they will return to sufficient strength to allow directed fishing in the near or even the medium term. During the year 2000, the Council will work toward developing a longer-term approach to the provision of its advice on groundfish stocks.

The Council has provided advice in the past which presages its longer term view for some stocks. For example, its 1999 advice on 4TVn cod noted: "*It [the Council] feels that no major changes of the TAC are likely to occur in the near future.*" Such observations have not included specific multi-year recommendations.

This longer term approach must also be balanced against the uncertainties in stock assessments with which the Council is presented. Last year, for example, the Council wrote:

> *"When the Council made its report to the Minister of Fisheries and Oceans for the 1998 fishing season it was confident that it had embarked on a rebuilding strategy for almost all groundfish stocks in this area. The Council was convinced that this was most certainly the case for 4X cod. The 1997 SSR had suggested two possible scenarios and the FRCC had adopted the more conservative approach.*
>
> *We note with dismay that the outlook for this stock has continued to decline despite following an approach that should have promoted rebuilding. This year's SSR again offers two different scenarios for this stock and at both $F_{0.1}$ levels the age 4+ biomass is expected to increase by 7,000t. The Council has recommended a TAC of 7,000t, which is slightly lower than $F_{0.1}$ level of 7,500t. We hope that we have adopted an approach that will promote rebuilding of this stock."*

These words, written last year, could serve for this year as well, with commensurately lower figures: they highlight the pitfalls of long term approaches to setting TACs.

## SCOTIAN SHELF AND BAY OF FUNDY STOCKS

In this report, the Council has recommended a significant reduction in the TAC for 4X cod, with a view to potentially maintaining this level if early signs of rebuilding are seen. However, such rebuilding signs have been glaringly absent as we have repeatedly recommended quota reductions for this stock in the last few years. The Council understands the economic hardship these levels will impose on communities and individuals, but it is our hope that this short term pain will lead to longer term gains.

The assessment for 4VWX5Zc pollock once again presents a snapshot of this stock significantly at odds with last year's assessment. It is our hope that the acoustic survey methodology now being deployed will reduce these inter-year variations.

The reduction of the silver hake TAC recommended in this report reflects the Council's concern with the high and increasing mortality exhibited in this stock.

## STOCKS OF 0, 2+3

The Council has recommended a significant reduction in the TAC of 3Ps cod, in line with discouraging information about both the stock and the conduct of the fishery. If the timing and selectivity of this fishery continue to focus on older, larger fish, and signs of incoming recruitment are not observed, the Council is not optimistic as to the future of the 3Ps cod stock. The Council has recommended this TAC with a view to maintaining it in the medium term, until stock recovery is apparent, and the conduct of the fishery is more evenly distributed in space, time and size of fish targeted. While the Council has made its recommendation with a view to maintaining this level in the medium term, it will not hesitate to recommend a further reduction in future years if the situation does not improve.

## REDFISH

Unit 1 redfish still shows no signs of recovery despite the moratorium on fishing of this stock: this lack of recovery is puzzling, and disconcerting to all concerned.

Unit 2 redfish is declining as the 1980 year class is fished down. This stock (and fishery) will continue to decline until a new year class appears on which to base a fishery. The new information emerging about the lack of genetic distinction between these stocks is also of note.

## DEFERRAL OF RECOMMENDATION ON ATLANTIC HALIBUT

The Council has decided to defer its recommendations for 2000 on Atlantic halibut until it has had data from the industry/DFO longline survey presented to it. This initiative is too important for the Council to ignore. The Council hopes that this data will be presented to it in late January, in time for it to consider and provide advice in February 2000.

# ENVIRONMENTAL OVERVIEW SCOTIA FUNDY

The following is drawn largely from the work of Ken Drinkwater, Roger Pettipas and Liam Petrie of DFO, with thanks.

The colder, lower salinity slope water that appeared along the continental slope in the autumn of 1997 began to penetrate through the channels and gullies of the southwestern Scotian Shelf in later 1997 and by February of 1998 had flushed all of Emerald Basin. It eventually replaced most of the lower-layer waters on the southwestern Shelf as evidenced by the data from the 1998 groundfish survey, which recorded the lowest temperatures in the 29 year time series for NAFO Division 4X.

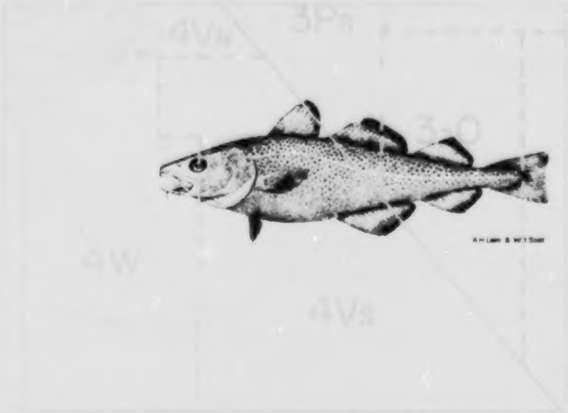
The near-bottom temperatures over the Scotian Shelf ranged from 3°C to over 10°C in the Gulf of Maine/Bay of Fundy and in the Scotian Gulf seaward of Emerald Basin during July 1999. These temperatures represent much warmer conditions than the previous year, upward of 4°C in the Brown's Bank region and 2°-3°C over most of the southwest Scotian Shelf. In the northwest, near bottom temperatures also generally warmed producing above normal temperatures in the region for the first time in almost 15 years.

Near-surface temperatures in July 1999 were maximum in the northeast and minimum in the Gulf of Maine and along the southwestern Atlantic coast of Nova Scotia. They ranged from 19°C off the northeastern Atlantic coast to 10°C off the southwestern shore. Except for a few isolated areas, the 1999 surface temperatures were warmer than the long-term averages. Relative to 1998, the surface temperatures had generally increased.

There was a large temperature decline in Emerald Basin in the early months of 1998 throughout all depths from 100 m to 250 m, a minimum in the spring, a slow recovery and return to the warm temperatures in mid-1999. In 1999, temperatures were above normal in Misaine Bank. Lurcher Shoals exhibited warmer-than-normal temperatures in 1999 after very cold temperatures during 1998. Georges Basin is very similar to deep Emerald Basin with warmer-than-normal temperatures in 1999 and colder-than-normal in 1998. In 1999, temperatures at Georges Bank were generally above normal while in 1998 they were below normal.

Generally, temperatures on the Scotian Shelf were significantly warmer in 1999.

# COD - 4VsW



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney (November 30), Shelburne (December 1) and Halifax, Nova Scotia (December 2). Industry representatives generally agreed that the prospects for this stock continue to be dismal. It was also suggested that oil and gas exploration and development in 4VsW may be having a detrimental impact on recruiting fish.

## ANALYSIS & RECOMMENDATIONS

The 1998 DFO Stock Status Report and the 1999 Groundfish Update indicate that:

- Average weight at age has shown some improvement in the last few years from the historic minimum in 1992.
- Surveys indicate that, since the mid-1980s, there has been an increase in the mortality of cod, other than that attributable to fishing, and which has persisted even after the closure of the fishery.
- The scientific evidence indicates that the increase in mortality from sources other than reported landings including discarding, direct and indirect effects of harsh environmental conditions, and predation by seals.
- The spawning stock biomass is at or near the lowest level seen, between 5% to 16% of the average from 1979-89. Making plausible assumptions about seal consumption and other natural mortality, the biomass is projected to decline 5% to 20%, even in the absence of any fishery.
- There are inconsistent indicators of recent year class strength, however, the weight of evidence suggests that recruitment has been poor.
- The models of cod consumption by grey seals imply a range from 5,400t to 22,000t of cod being removed by seals. These are relative to estimated biomass of 32,000t to 37,000t respectively. It is not possible with the available data to choose among these models.
- The 1999 survey showed the first recruitment in many years.

The FRCC notes that following the recommendations for the 1998 fishery, the March 1998 Research Vessel Survey has been reinstated and the fishing industry has funded this survey.

The FRCC continues to be particularly concerned about the very low productivity of this stock and the lack of growth of the spawning stock since the fishery closure in 1993. Two key issues are thought to be related to the poor productivity of the stock:

*Environment:* In 1998, this area experienced lower than normal water temperatures and scientists reported an increase in cold water species such as capelin in this area. In 1999 this cold water seems to have dissipated. It is anticipated that the warmer water now in the area will have a positive effect on recruitment.

*Seals:* The mean percentage of cod (mainly of younger ages) in the grey seal diet has remained at about 12%. Given that the grey seal population has apparently continued to increase at the same rate as previously measured, the estimate of consumption of 4VsW cod by grey seals in 1997 was between 5,400 - 22,000t.

The distribution of catches in the Sentinel surveys show most of the cod are found on the 4W banks (Western, Sable, Emerald) throughout the year. The Sentinel survey distribution also indicates that, at least during the fall, there are concentrations of cod in the nearshore areas.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that there be no directed fishery for cod in 4VsW in 2000/2001.**

**2. The FRCC recommends that restrictive by-catch measures should be implemented to minimize by-catches in all fisheries directed at other species.**

**3. The FRCC recommends that no recreational or**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 55 | 48 | 44 | 38 | 35.2 | 35.2 | 35.2 | 35.2 | Moratorium | | | | | | |
| Catch | 57.8 | 57.1 | 45.5 | 38.2 | 37.2 | 34.3 | 33.2 | 29.8 | 3.2 | 0.35 | 0.28 | 0.24 | 0.25 | 0.22 | 0.18 |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

**food fisheries take place given the very precarious state of the cod stock in this area.**

## History of FRCC Recommendations

In August 1993, based on the drastic stock decline, the Council recommended that the 4VsW cod fishery be halted immediately. The fishery was closed in September. In November 1993, the Council recommended that there be no directed fishing for the 4VsW cod stock in 1994 and that by-catches be kept to the lowest possible level. Again in 1994, the Council recommended that there be no directed fishing for 4VsW cod in 1995 and that by-catches be kept to the lowest possible level. This recommendation was repeated for the 1996, 1997, 1998, and 1999 fishing seasons. Consequently, the fishery has remained closed.

It was further recommended that no recreational or food fisheries take place in the area, given the very precarious state of the cod stock. The Council also recommended for 1998 the immediate re-instatement of the March Research Vessel (RV) survey. The survey has continued since 1998 as an industry-funded initiative.

### Council's Views on Stock Status

| | |
|---|---|
| Overall indicator: | low |
| | *Compared to average* |
| Spawning biomass: | below average |
| Overall biomass: | well below average |
| Recruitment: | below average level of recruitment |
| Growth/Condition: | below average |
| Age structure: | below average (smaller fish at age) |
| Distribution: | below average |
| Recent exploitation: | fishery closed since September 1993 |

# COD - 4VN (M-O)

## 1999 CONSULTATIONS

The FRCC held a consultation with stakeholders in Sydney, Nova Scotia, on November 30, 1999. Although there were no comments that this stock was in a healthy state, (e.g., near mid-1980 levels of abundance), some comments suggested that there were signs of improvement for 4Vn cod (e.g., higher sentinel fishery catch rates). Fishermen were critical of the coverage of the commercial index and the inadequate sampling in deeper waters of 4Vn.

## ANALYSIS & RECOMMENDATIONS

The 1998 Stock Status Report and 1999 Groundfish Update indicate that:

- A high level of stock mixing in the area confounds the assessment.
- Recruitment continues to be poor; the inshore survey indication of a good 1995 year class was not supported by research vessel results.
- Total mortality rates are still high despite the moratorium, suggesting migration of fish out of the area, or a lack of survival.
- Catch rates in the sentinel survey declined consistently from 1994 to 1998.
- Geographical distribution of cod (in sentinel fishery) has not changed over time.
- Total biomass and adult biomass remain very low; no recovery is possible in the short term.
- The addition of information from the most recent vessel survey and results from the Sentinel fishery do not change the outlook for this resource for the year 2000.

**1. The FRCC recommends that there be no directed fishery for cod in 4Vn (M-0) in 2000/2001.**

**2. The FRCC recommends that restrictive by-catch measures should be implemented to minimize by-catches in all fisheries directed at other species.**

Sentinel surveys provide valuable on-going information about the stock in the absence of a full commercial fishery. Industry and DFO Science confirmed during consultations that the current survey coverage is not adequate especially in deeper water.

**3. The FRCC recommends that the Sentinel survey using commercial vessels continue for the 2000-2001 fishing year, and that industry be encouraged to work closely with DFO Science to consider expanding the survey to include deeper water areas in 4Vn and provide adequate coverage throughout the entire 4Vn management area.**

## HISTORY OF FRCC RECOMMENDATIONS

In August 1993, the Council recommended that fishing on this stock be halted immediately. The recommendation was accepted and the fishery was closed in September. In November 1993, the Council recommended that there be no directed fishing for this stock in 1994 and that by-catches be kept to the lowest possible level. This recommendation was repeated in November 1994 for the 1995 fishing year and again in November 1995 for the 1996 fishing season. These recommendations were accepted and the fishery has remained closed. In October 1996, the FRCC again recommended that there be no directed fishery for 4Vn Cod in 1997. Council also recommended that there be an expanded Sentinel Fishery with a strong commercial index component.

The Council had recommended in 1997 that a workshop involving industry be held in 1998 to assess the Sentinel survey in 4Vn and in particular to determine if

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 12 | 12 | 9 | 7.5 | 7.5 | 7.5 | 10 | 10 | 1.8 | | | Moratorium | | | |
| Catch | 12.1 | 12 | 10.3 | 8.9 | 7.3 | 4.9 | 4.6 | 4.2 | 0.6 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.12 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

the commercial index could be made viable and continued.

For 1998 and 1999, the Council repeated its recommendation that there be no directed fishery of this stock and that by-catches be kept to a minimum. It was also recommended that Sentinel surveys continue for several years into the future.

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall indicator: | very low levels |
| | *Compared to average* |
| Spawning biomass: | far below average |
| Total biomass: | far below average |
| Recruitment: | very low |
| Growth/Condition: | average, improved from low values of 92-94 |
| Age structure: | no good recruitment years since 1987, all ages depressed |
| Distribution: | steady in recent years, worse than in past |
| Recent exploitation: | fishery closed since Sept. 1993; total mortality still high |

# COD - 4X

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Halifax, Nova Scotia (December 2) and Shelburne, Nova Scotia (December 1). Many comments were received about 4X cod in both locations and, in addition, a number of written briefs commented on the state of this resource.

Several written briefs received from industry in southwestern Nova Scotia called for the TAC to remain at 7,000t. Other briefs recommended TAC increases for 2000-2001 to 10,000t. During consultations in Shelburne and Halifax, industry representatives noted that recent climatic changes, in particular, the 1998 influx of colder Labrador slope water leaving the area, was having an effect on the spatial distribution of cod with an apparent shift to the eastern portion of 4X. The fixed gear sector stated that what fishermen experienced in their catches (e.g., older cod in good condition) during 1999 was the opposite to the negative view of stock status that was presented by DFO Science in the stock assessment. Fishermen claimed that cod were plentiful especially in the eastern portion of 4X. The industry suggested that more fish be tagged under a scientific program to study stock migrations.

Finally, it was noted that the problem with effort shift to the mouth of the Bay of Fundy had been taken out of proportion and the shift had more to do with management measures, gear conflict and closed areas than with a change, or shrinking, of the resource.

## ANALYSIS & RECOMMENDATIONS

The 1999 Stock Status Report indicates that:

- Landings were the lowest on record in 1998 at just over 8,000t.
- Recruitment has been below average since 1992.
- There is considerable uncertainty in the estimates of recent stock abundance and exploitation levels.
- Exploitation rate has declined from the high of 64% in 1992, and is estimated to be about 30% in 1998.
- Spawning stock biomass is estimated to be stable at a low level (20,000t) since 1996.
- Yield projection at $F_{0.1}$ for the 2000-2001 fishing year is likely between 4,000t, and 6,000t.

The Council is very concerned about the continued lack of incoming recruitment of this stock, the reliance of the stock on few strong year classes (e.g., the above average contribution of the 1992 year class), and the lower than anticipated contribution to the fishery of the 6+ ages. Although the spawning stock biomass (ages 4+) increased from the historical low of near 10,000t in 1995, and exploitation rates declined since 1994, the stock has not realized its anticipated year-over-year growth and remains in a stable state at the low biomass level of approximately 20,000t, well under the average of over 40,000t throughout the 1980s.

The paramount FRCC objective for this stock is the rebuilding of a spawning stock biomass composed of a wide range of ages, particularly of older fish, across all spawning components of this stock. It is therefore important to take conservation measures that enhance the probability that the spawning biomass will continue to increase and broaden in age structure among all stock components.

The apparent negative outlook of the SSR is not compatible with the views of fishermen for this stock. In particular, observations from fixed gear fishermen (e.g., better availability and wider distribution into the eastern portion of 4X) support their claim that the stock is rebuilding to the higher levels of the mid-1980s. However, mobile gear fishermen are generally not as optimistic from their experience in 1999. Consequently, the Council deems it precautionary to lower the TAC in hopes of anticipating better survival of the older cod in the population and realizing improvements in stock recruitment.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 30 | 20 | 17.5 | 14 | 12.5 | 12 | 26 | 26 | 15 | 13 | 9 | 11 | 13 | 9.3 | 7 |
| Catch | 20 | 19.2 | 18.5 | 19.1 | 19.4 | 22.7 | 26.7 | 25.5 | 15.8 | 13.1 | 8.8 | 10.6 | 11.5 | 8.17 | 5.87 |

*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

The FRCC was concerned by the apparently conflicting perspectives from scientists and the fishing industry:

- Maintaining the 1999 TAC for 2000/2001, which most fishermen supported. This would mean, on the one hand, to acknowledge that the state of the stock allows such a harvest rate in order to maintain short-term economic stability. On the other hand, it would result in no stock growth or perhaps a further decline.
- Drastically reducing the TAC, in line with the agreement between the scientific information and the views of some fishermen that the health of the stock is precarious. This would provide the better chance for the stock to rebuild.

In light of the FRCC's conservation objective of "*rebuilding stocks to their 'optimum' levels and thereafter maintaining them at or near these levels*", the first of these perspectives was felt too risky as it would inevitably mean "chasing the quotas down" to the point where, in the near future, a fishing closure could not be avoided. The second course will allow a greater probability of stock recovery, especially if recruitment trends remain confirmed. The FRCC is very conscious of the pain and the heavy burden this will impose on the fishing communities involved. However, the recent history of the fisheries of Atlantic Canada strongly suggests that maintaining catches can lead to far greater losses in the longer term.

**1. The FRCC recommends that the TAC for cod in 4X be set at 4,000t for 2000/2001.**

The Council also recognizes the important contribution made by industry to the information available about this stock, especially through the ITQ survey, which has become an important tool in assessing 4X cod.

The Council is also aware that these restrictions to the cod allowable catch will make it more difficult for some fishermen to participate fully in other fisheries, e.g., the 4X haddock fishery. To this end, the Council encourages DFO and industry to work together to reduce the problem of catch of non-directed species. The Council reiterates that under any circumstances, discarding and dumping are not acceptable fishing strategies. The Council encourages DFO Fisheries Management and industry to be vigilant in reporting and acting on any such fisheries violations that will negate the expected longer term improvements in stock status.

**2. The FRCC recommends that DFO Fisheries Management, in consultation with industry, review levels of at-sea boarding, dockside monitoring, and observer coverage and make changes where necessary to ensure that dumping, discarding, and misreporting does not take place.**

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | below average |
| | *Compared to average* |
| Spawning biomass: | stable at low levels; reached minimum in 1994; increased since but remains unchanged at a low level associated with poor recruitment |
| Total Biomass: | same as above |
| Recruitment: | very low since 1992 |
| Growth and Condition: | good |
| Age Structure: | older ages comprise lower proportion of landings than anticipated, likely overestimated |
| Distribution: | return to normal in 1999; more fish in eastern portions of 4X |
| Recent Exploitation: | reached a high in 1992; declined since but still above target |

# HISTORY OF FRCC RECOMMENDATIONS

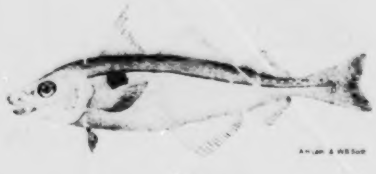
In August 1993, the Council recommended, as a precautionary conservation measure, that the 1993 TAC be reduced from 26,000t to 15,000t. In November 1993, the Council recommended that the 1994 TAC for 4X cod be set at 13,000t. In addition, the Council recommended that other conservation measures, such as (a) improved selectivity of fishing gears (increased hook and mesh sizes), (b) limitations on the quantity and dimensions of fishing gear used, and (c) expanded use of area closures to protect spawning and/or juvenile aggregations, be considered for this fishery. In November 1994, the Council recommended that the 1995 TAC for 4X cod be set at 9,000t. As well, Council recommended that a workshop be organized jointly by the Department of Fisheries and Oceans and industry with the objective of an orderly fishery and the elimination of dumping, discarding and misreporting; and finally the Council recommended that should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved. In the fall of 1995, the Council recommended a TAC of 11,000t for 1996 with mandatory dockside grading for all gear types.

For 1997, the FRCC recommended that the TAC be set at 13,000t, mandatory dockside monitoring be maintained for all gear types, and, the dialogue between DFO and industry concerning dumping, discarding and misreporting continue, to ensure that management measures to avoid these problems remain in place.

For 1998, the Council recommended that the TAC for this stock be set at 9,300t, and as an immediate priority, DFO Management and Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. The Council further recommended that there be an update on genetic information on the Bay of Fundy and Scotian Shelf components of this stock with a view to determining if a geographic split in the stock between those two areas is appropriate.

For 1999, the Council recommended that the TAC be set at 7,000t and that measures be taken to protect the 1996 year class.

# HADDOCK - 4TVW



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney (November 30) and Halifax, Nova Scotia (December 2). There were no stakeholder comments on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1997 Stock Status Report and 1999 Groundfish Update indicate that:

- Adult population biomass is low, and likely to decrease further.
- Recruitment has been below average in every year since the mid-80s (except 1988), but the 1995 to 1997 year classes may be almost up to average.
- A dramatic increase in very young (0 group) haddock was seen in the 1999 survey.
- Condition of adults and juveniles has improved.

This stock shows a high natural mortality in the range of 40%. Fishing alone has not caused the collapse. Harsh environmental conditions and, to a lesser extent, seals were factors contributing to this decline.

A reversal of poor ecological conditions is required before improvement in stock status can be expected.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that there be no directed fishery for haddock in 4TVW in 2000/2001.**

**2. The FRCC recommends that restrictive by-catch measures should be implemented to minimize by-catches in all fisheries directed at other species.**

**3. The FRCC recommends that the closure of the haddock box to all commercial groundfish fishing be continued.**

## HISTORY OF FRCC RECOMMENDATIONS

In August 1993, the Council expressed concern about the low level of this stock. In 1993, 1994, 1995 and 1996, the Council recommended that there be no directed fishing for the 4TVW haddock stock and that the closure of the haddock box to all gears be continued.

In November 1997, the Council re-iterated recommendations that there continue to be no directed fishing for 4TVW haddock in 1998 and that the closure of the haddock box to all gears be continued. The FRCC also recommended that the deterioration in the condition factor of 4TVW Haddock be monitored. These recommendations were repeated for 1999.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 15 | 17 | by-catch | | 6.7 | 6 | by-catch | | Moratorium | | | | | | |
| Catch | 11.9 | 16.3 | 4.2 | 3.9 | 9.1 | 6.8 | 5.8 | 5.9 | 1.2 | 0.09 | 0.09 | 0.10 | 0.06 | 0.07 | 0.06 |

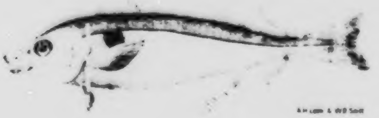
*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | very low |
| | *Compared to average* |
| Spawning biomass: | far below average (1/3 of long term average) |
| Total biomass: | far below average (1/3 of long term average) |
| Recruitment: | below average; possibly two year classes near average; 1999 may be good |
| Growth/Condition: | improving |
| Age structure: | low biomass but reasonable spread in ages |
| Distribution: | steady in recent years |
| Recent exploitation: | fishery closed since 1993 (but total mortality still high) |

# HADDOCK - 4X



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Shelburne (December 1), and Halifax, Nova Scotia (December 2). Participants' feedback was in agreement with the scientific assessment that the indicators for this stock have remained positive again this year. There was however some concern for the general and continued decline in weight-at-age and persistent low stock condition factors. It was noted that a return to average weights-at-age would improve the outlook for this stock. In the written briefs, industry supported the anticipated continued growth of this stock and recommended fishing at levels between 8,200t and 9,000t, slightly above the 1999 TAC of 8,100t.

## ANALYSIS & RECOMMENDATIONS

The 1999 Stock Status Report indicates that:

- Reported landings of 4X haddock increased from a low of 4,406t in 1994 to 7,843t in 1998 (up from 6,547t in 1997). Landings in the first half of 1999 were 2,313t (down from 3,597t in the first half of 1998).
- Both the 1993 and 1994 year classes are estimated to be strong; the 1995 year class is weak; 1996 year class is above average.
- Exploitation rate for ages 5-7 decreased from approximately 50% in the early 1980s and dropped below $F_{0.1}$ from 1994 through 1997. The exploitation rate in 1998 met its expectation (from the 1998 SSR) of being near $F_{0.1}$ (20%). Similarly, in 1999 the exploitation rate is expected to be near 20% if catches do not exceed the 1999 TAC of 8,100t.
- The projected yield at $F_{0.1}$ in the year 2000 would be about 8,200t.
- If fished at $F_{0.1}$ in the year 2000, the spawning stock biomass is projected to increase to 39,000t by 2001.

In response to the FRCC's 1998 recommendations, DFO Fisheries Management provided a review of levels of at-sea boarding, dockside monitoring, and observer coverage for the 4X cod, haddock, pollock, and white hake fisheries. In the future, it is anticipated that this valuable information can be provided as a regular report to the FRCC in advance of the FRCC's consultation with fishermen.

DFO Science have updated their investigations on the shift of effort into the Bay of Fundy region that predominated the FRCC's concerns for 4X stock in 1998. Following on the updated 1999 information on TVRP fishing effort, Fisheries Management, Science and fishermen at consultations generally agreed that 1999 was typical of more normal fishing patterns in the area. In retrospect, participants attributed earlier concerns in 1998 with regard to effort shift to the influx of cold water along the Scotian Shelf and into the Bay of Fundy. The return to more normal water temperatures in the area in 1999 is credited with a return to more normal fishing patterns.

To 'stay the course' at the 1999 TAC level will allow for continued expected rebuilding of the stock and for industry to achieve more sustained future benefits from this stock. Achievement of a broad age structure in the population, enhancement of the population of older, more productive spawners, and recovery of weights-at-age are realistic medium term objectives for this stock. A recovery of weights-at-age in particular would result in the opportunity for an appreciable increase in the TAC.

**1. The FRCC recommends that the TAC for 4X haddock be set at 8,100t in 2000/2001.**

Difficulties in estimating variable recruitment and the concentration of the fishery on few year classes requires care in maintaining the sustainable potential for this fishery.

**2. The FRCC recommends that management measures be enforced to protect juvenile haddock and incoming recruitment and efforts to avoid the capture of small fish be continued.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 15 | 15 | 15 | 12.4 | 4.6 | 4.6 | 0 | 0 | 6 | 4.5 | 6 | 6.5 | 6.7 | 8.1 | 8.1 |
| Catch | 15.3 | 15.3 | 13.7 | 11 | 6.9 | 7.4 | 10 | 10.2 | 6.6 | 4.41 | 5.67 | 6.25 | 6.53 | 7.43 | 5.91 |

*Catch as of Nov 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## HISTORY OF FRCC RECOMMENDATIONS

In its August 1993 report, the Council recommended that every action be taken to ensure that there are no overruns of the 1993 quota. The stock was closed to fishing in September because the quotas had been taken. In November 1993, the Council recommended that the 1994 TAC for 4X haddock be set at 4,500t (by-catch only) and that every action be taken to ensure that there are no overruns of this quota. In November 1994, the Council recommended that the 1995 TAC for 4X haddock be set at 6,000t. The Council recommended that, prior to the 1995 fishing season, a workshop be organized jointly by the Department of Fisheries and Oceans and the industry, with the objective of an orderly fishery, and the elimination of dumping, discarding and misreporting. Finally, the Council recommended that, should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved. In November 1995, the Council recommended that the 1996 TAC for 4X Haddock be set at 6,500t, that mandatory dockside grading be implemented for all gear types and that the same closure procedure as recommended in 1995 be implemented for 1996.

In October 1996, the FRCC recommended that the 1997 TAC be set at 6,700t and mandatory dockside monitoring be maintained for all gear types. The Council noted, as part of its recommendation, that should there be sufficient evidence of dumping, discarding and misreporting, the fishery be closed for the gear type involved until such time as fisheries managers can be assured that this activity will not continue; and fisheries managers take appropriate measures to ensure the protection of incoming year classes, including rigorously enforcing existing small fish protocols.

In November 1997, the Council recommended that the TAC for 4X Haddock be set at 8,100t and as an immediate priority, DFO Management/Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. The Council also recommended that the decrease in condition factor be monitored.

In 1998, the Council was very concerned about an apparent shift in fishing effort from east to west by groundfish fleets into the Bay of Fundy. As a consequence of this apparent shift, and the continued difficulties of the Scotian Shelf groundfish recovery, there was real concern that an east to west phenomenon of stock decline was being observed. Accordingly, the FRCC made a series of recommendations for 4X groundfish stocks, including haddock, related to gathering information and analyzing the possibility of this possible threat to stock conservation.

### COUNCIL'S VIEWS ON STOCK STATUS

Overall Stock Indicator:

| | *Compared to average* |
|---|---|
| Spawning biomass: | above average since the mid 1980s |
| Total biomass: | above average since the mid 1980s |
| Recruitment: | 1993, 1994 strong year classes; 1995 weak; 1996 above average |
| Growth/Condition: | low and continuing declining trend |
| Age structure: | fewer than expected in older ages: 95% 3-5 year olds, 2% >9 year old |
| Distribution: | return to normal in 1999 |
| Recent exploitation: | at or below $F_{0.1}$ since 1994 |

# POLLOCK - 4VWX5Zc

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney (November 30), Shelburne (December 1), and Halifax, Nova Scotia (December 2). Fishermen reported that there were lots of small fish inshore to an extent that they had not seen in recent years. They also reported that pollock could be found in 1999 beyond the extreme east (3Ps) and west (5Z) ends of the management unit. It was also noted that fishing restrictions such as avoidance of hake prevented fishermen from targeting pollock more directly. Difficulties in assessing this stock were universally cited at the consultation meetings. Participants reacted to alternative assessment formulations in recent years by noting the lack of year-over-year consistency in the approach to evaluating the stock. Other fishermen expressed frustration with the results of the stock assessment and their own more optimistic observations about stock status throughout the management area.

Presentations and written briefs were generally conservative – no recommendations exceeded the status quo TAC for 1999 of 12,000t. Recommendations for the 2000/2001 TAC ranged from 8,000t to 12,000t.

## ANALYSIS & RECOMMENDATIONS

The 1999 Stock Status Report indicates that:

- The fishery in 1999 has been poor compared with 1998 in most areas (1998 was considered poor compared to 1997).
- The geographic scope of the fishery is again constricted, as was also reported in 1998, with the largest proportion of landings coming from western 4X.
- The ranges of size and age of pollock caught in the research vessel surveys and commercial fishery has continued to diminish.
- The index of abundance (commercial fishery catch rates) has declined for the past three years and is now at the lowest level observed for the series.
- The catch at the $F_{0.1}$ mortality is estimated for the 4X component only and proportioned to the whole management area. The estimated catch at this target mortality is 7,000t for the year 2000.
- The pollock stock remains depleted and continuing caution in establishing harvest levels is required.

In 1999, industry has noted again that various negative impacts on CPUE, which has declined for the past three years, are related in part to restrictive management measures and to the influence of cold water temperatures. However, it is apparent that the shrinking geographic range of pollock landings, as an indicator of stock decline, is a recurring theme in groundfish stocks in this area.

Observations from participants continue to point out the lack of confidence in the reliability of the assessment of this stock. Marked differences in the assessment formulations do not provide a consistent year-over-year perspective on stock status. There continues therefore, to be a large degree of uncertainty about abundance of this stock. As a consequence, TACs established through the current decade (1991 through 1998) averaged 20,000t. The lowest TAC in this time series was 10,000t (1996). The Council continues to find itself without a clear point of historical reference in providing a TAC recommendation.

Following on its 1998 recommendations for alternative methods for estimating stock abundance, the initiation of a DFO/industry acoustics data survey in the year 2000 may provide an independent dataset on stock status that could in time provide a benchmark for estimating the biomass of this stock. The FRCC encourages this cooperative initiative dedicated to dealing with the historical difficulties of assessing this stock.

Setting the TAC equal to the lowest level this decade is indicative of severe uncertainties in estimating stock status, declining indices of abundance, and shifts in stock distribution out of the defined management area.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 42.4 | 40 | 43 | 43 | 43 | 38 | 43 | 43 | 21 | 24 | 14.5 | 10 | 15 | 20 | 12 |
| Catch | 43.8 | 44.3 | 46 | 42.9 | 43.7 | 37.9 | 38.5 | 33.7 | 20.8 | 15.3 | 9.8 | 9.2 | 11.9 | 14.3 | 6.8 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

**1. The FRCC recommends that the TAC for 4VWX5Zc pollock be set at 10,000t in 2000/2001.**

Uncertainties associated with the overall abundance in the current stock assessment, along with the stated assumptions on the relative distribution of the resource between 4X and other areas, raises concern that a disproportionate amount of the catch comes from a small area rather than being spread throughout the management area.

**2. The FRCC recommends that consideration be given to ensuring that the proportion of the catch in the 2000-2001 fishing season in Sub-Area 4X of the total management area not exceed catch levels experienced in recent years.**

## HISTORY OF FRCC RECOMMENDATIONS

In August 1993, the Council recommended, as a precautionary conservation measure, that the 1993 TAC be reduced from 35,000t to 21,000t. The Council also noted that the closure of the 4VsW cod fishery could cause some redirection of effort to the pollock fishery. In November 1993, the Council recommended that the 1994 TAC for 4VWX5Zc pollock be set at 24,000t, the F0.1 catch level then calculated for 1994. In 1994, the Council recommended that the 1995 TAC for 4VWX5Zc pollock be set at the revised F0.1 calculation of 14,500t. The Council also recommended that Fisheries and Oceans scientists work with the industry to determine if, and during what times of the year, it would be appropriate to establish closed areas for 4VWX5Zc pollock to protect the spawning stock. The Council notes that the 2nd Groundfish Workshop held in early October 1995 provided a forum to discuss possible measures to further improve conservation of groundfish stocks in this area. In November 1995, the Council recommended that the 1996 TAC for 4VWX5Zc pollock be set at 10,000t.

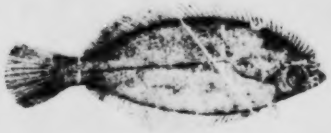
In October 1996, the FRCC recommended that the 1997 TAC be increased to 15,000t. The Council cautioned that DFO scientists continue to work with the industry to determine if, and during what times of the year, it would be appropriate to establish closed areas for 4VWX5Zc pollock to protect the spawning stock. The Council also recommended that DFO scientists look at other abundance indicators.

In November 1997, the Council recommended that the 1998 TAC for 4VWX5c Pollock be set at 20,000t; and as an immediate priority, DFO Management/Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. The Council also recommended that the decline in condition factor be monitored.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | likely much below average |
| | *Compared to average* |
| Spawning biomass: | uncertain but likely much below average; at levels normally associated with poor recruitment |
| Total Biomass: | below average |
| Recruitment: | 1992-1995 year classes below average |
| Growth and Condition: | slight decline in weights at age |
| Age Structure: | size and age of fish diminishing |
| Distribution: | increasingly constricted |
| Recent Exploitation: | was much above target in early nineties; likely reduced since with decline in mobile gear effort |

# FLATFISHES - 4VW



## 1999 CONSULTATIONS

The FRCC held public consultations on these stocks in Sydney (November 30), Shelburne (December 1) and Halifax, Nova Scotia (December 2). There were no direct comments on these stocks. Written briefs recommended status quo.

## ANALYSIS & RECOMMENDATIONS

### 4VW Flatfish

No assessment has been conducted since 1996, except for witch flounder, which was assessed in 1997 separately from other flatfish.

The 1997 Stock Status Report and 1999 Groundfish Update indicate that:

- Biomass is in decline; resource status deteriorated in the last few years.
- Rebuilding unlikely unless catches kept below the 1996 level, and effort kept below that of recent years.
- Winter flounder: abundance remains relatively high; not fished commercially in 4VW.
- Plaice: depleted and declining, fewer large fish than in the past, possible incoming recruitment – catches since 1996 higher than previously thought.
- Yellowtail: depleted to a very low level, no incoming recruitment – catches have declined dramatically.

The 1997 Stock Status Report and 1999 Groundfish Update for Witch flounder indicate that:

- Fishable population declined from 1980s levels to low of 1992-93, remaining low at present.
- Pre-recruits highly localized in Gully and deep holes north of Banquereau Bank in 4VsW.
- Avoid increased effort on witch, to protect incoming recruitment and allow rebuilding.
- Likely some linkage with stocks to north and east.
- Recruitment since 1993 has been stronger than in earlier periods, peaking in 1997.

The FRCC has not changed its outlook on these stocks.

**1. The FRCC recommends that the TAC for 4VW flatfish be set at 3,000t in 2000/2001.**

**2. The FRCC recommends that the proportionate catch of Witch in 4VW flatfish stocks not exceed current levels to protect incoming recruitment.**

**3. The FRCC recommends that minimum size limits be enforced to protect incoming recruitment and efforts to avoid the capture of small fish be continued.**

**4. The FRCC recommends that work continue by DFO and industry to address the problem of species identification.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council recommended that efforts underway to obtain better information on the landings by species and area be encouraged in order to provide a more rational basis for conservation measures for this resource complex in future years. The Council also recommended that, pending the provision of more reliable catch data on flatfish on the Scotian Shelf, the 1994 TAC for 4VWX flatfish be set at 14,000t. In November 1994, based upon available information, the Council concluded that both the effort and the TACs for these stocks needed to be reduced further and, as well, that the proportions between the two units should be changed to better reflect relative stock abundance. The Council recommended that the global 1995 TAC for all 4VWX flatfishes be set at 7,500t. In November 1995, the Council recommended that the 1996 TAC for 4VW flatfishes be set at 3,500t and that the 1996 TAC for 4X+5 flatfishes be set at 3,375t.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | 5.5 | 4.125 | 3.5 | 3 | 3 | 3 |
| Catch | 7.7 | 7.4 | 8.9 | 7.3 | 7.7 | 7.2 | 5.6 | 5.3 | 4.2 | 3.5 | 2.3 | 2 | 2 | 1.51 | 1.81 |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

In October 1996, the FRCC recommended that the 1997 TAC for 4VW flatfishes be set at 3,000t and the 1997 TAC for 4X+5 flatfishes be set at 3,000t and that efforts to avoid the capture of small fish be continued for both of these fisheries. The Council also recommended that work be carried out by DFO and the industry, possibly in conjunction with the dockside monitoring program, to address the problem of species identification.

For 1998 and 1999, the Council reiterated the previous years' recommendations and suggested that DFO and industry continue to work to address the problem of species identification.

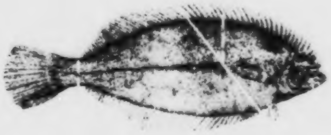
### COUNCIL'S VIEWS ON STOCK STATUS (FLATFISH EXCEPT WITCH)

| | |
|---|---|
| Overall Stock Indicator: | low (potential for rebuilding) |
| | *Compared to average* |
| Spawning biomass: | low |
| Total biomass: | low |
| Recruitment: | signs of recruitment, except Yellowtail |
| Growth/Condition: | no particular observation |
| Age structure: | shift toward smaller fish |
| Distribution: | species specific |
| Recent exploitation: | too high - must keep catches below 1996 level for rebuilding |

### COUNCIL'S VIEWS ON STOCK STATUS (WITCH FLOUNDER)

| | |
|---|---|
| Overall Stock Indicator: | low-Medium (rebuilding) |
| | *Compared to average* |
| Spawning biomass: | low |
| Total biomass: | average |
| Recruitment: | strong |
| Growth/Condition: | no particular observation |
| Age structure: | good for pre-recruits; older ages lowest observed |
| Distribution: | average |
| Recent exploitation: | too high |

# FLATFISHES - 4X



## 1999 CONSULTATIONS

The FRCC held public consultations on these stocks in Shelburne (December 1), Halifax, Nova Scotia (December 2). There were no directed comments on these stocks. Written briefs recommended status quo.

## ANALYSIS & RECOMMENDATIONS

The 1997 Stock Status Report and 1999 Groundfish Update indicates that:

- Given efficiency increases, declines in catch rates may under-estimate stock declines.
- The precautionary approach implies immediate action is needed to reduce fishing effort on 4X flatfish (could be done by lowering the TAC so landings in 1998 are less than those in 1996).
- Fishing effort should be spread proportionately among species.
- Some stability in stock status in recent years.

### Winter flounder

- Some decline in <30cm fish; little change in >30cm fish, but decline in >40cm fish.
- Industry notes decline in abundance, which is consistent with decline in catch rates.

### Plaice

- Decline in <30cm fish since 1994, little change in >30cm fish, clear decline in >40cm fish.
- No significant new recruitment.
- Low commercial catch rates, consistent with industry view of declining abundance.

### Yellowtail

- Some increase in <30cm fish, possible increase in >30cm fish, decline in >40cm fish.
- No significant new recruitment.
- Industry notes declining abundance in keeping with lower CPUE.

### Witch flounder

- Fishable population declined from 1980s to low of 1992-93, still near lowest level observed.
- Pre-recruit (<35 cm) abundance (early-90s year classes) now highest in 28-year series.
- Small witch (<14 cm, probably 2-year-olds) remain at low abundance (in contrast to 4VW).
- Crucial to avoid increased effort on witch, to protect incoming recruitment and allow rebuilding.
- Likely some linkage with stocks to south and west.

**1. The FRCC recommends that the TAC for 4X flatfish be set at 2,000t for 2000/2001.**

**2. The FRCC recommends that the proportionate catch of Witch in 4X flatfish stocks not exceed current levels to protect strong incoming recruitment.**

**3. The FRCC recommends that minimum size limits be enforced to protect incoming recruitment and efforts to avoid the capture of small fish be continued.**

**4. The FRCC recommends that work continue by DFO and industry to address the problem of species identification.**

Some stakeholders recommended in written briefs that the closure of identified spawning areas would protect incoming recruitment.

**5. The FRCC recommends that identified spawning areas be closed during spawning periods.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | 4.5 | 3.375 | 3.375 | 3 | 2 | 2 |
| Catch | 3.92 | 5.59 | 4.28 | 4.65 | 3.33 | 6.1 | 5.8 | 5.9 | 4 | 2.54 | 2.5 | 2.48 | 2.01 | 1.41 | 1.25 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council recommended that efforts underway to obtain better information on the landings by species and area be encouraged in order to provide a more rational basis for conservation measures for this resource complex in future years. The Council also recommended that, pending the provision of more reliable catch data on flatfish on the Scotian Shelf, the 1994 TAC for 4VWX flatfish be set at 14,000t. In November 1994, based upon available information, the Council concluded that both the effort and the TACs for these stocks needed to be reduced further and, as well, that the proportions between the two units should be changed to better reflect relative stock abundance. The Council recommended that the global 1995 TAC for all 4VWX flatfishes be set at 7,500t. In November 1995, the Council recommended that the 1996 TAC for 4VW flatfishes be set at 3,500t and that the 1996 TAC for 4X+5 flatfishes be set at 3,375t.

In October 1996, the FRCC recommended that the 1997 TAC for 4VW flatfishes be set at 3,000t and the 1997 TAC for 4X+5 flatfishes be set at 3,000t and that efforts to avoid the capture of small fish be continued for both of these fisheries. The Council also recommended that work be carried out by DFO and the industry, possibly in conjunction with the dockside monitoring program, to address the problem of species identification.

The Council recommended that the 1998 and 1999 TAC for 4X flatfish be set at 2,000t, that the proportionate catch of Witch in 4X flatfish stocks not exceed current levels and that efforts to avoid the capture of small fish be continued. The Council also recommended that work by DFO and industry to address the problem of species identification continue.

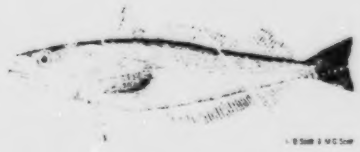
### COUNCIL'S VIEWS ON STOCK STATUS (FLATFISH EXCEPT WITCH)

| | |
|---|---|
| Overall Stock Indicator: | low-medium |
| | *Compared to average* |
| Spawning biomass: | uncertain: low-average |
| Total biomass: | uncertain: low-average |
| Recruitment: | poor |
| Growth/Condition: | No particular observation |
| Age structure: | reduced age range for all three species |
| Distribution: | species specific |
| Recent exploitation: | effort considered too high |

### COUNCIL'S VIEWS ON STOCK STATUS (WITCH FLOUNDER)

| | |
|---|---|
| Overall Stock Indicator: | low, but rebuilding |
| | *Compared to average* |
| Spawning biomass: | low |
| Total biomass: | average |
| Recruitment: | strong |
| Growth/Condition: | no particular observation |
| Age structure: | good for pre-recruits; older ages lowest observed |
| Distribution: | average |
| Recent exploitation: | effort considered too high |

# SILVER HAKE - 4VWX



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney, NS (November 30), Shelburne, NS (December 1), and Halifax, NS (December 2). Comments were received about silver hake in Shelburne and Halifax. In addition, a number of written briefs commented on the state of this resource. In all presentations and briefs, industry participants called on the Council to keep the TAC at 30,000t. They did not believe that the 1997 year class was as low as DFO projected, because a large proportion of their catch consisted of two year olds. It was noted that the pre-recruit data is missing as the research vessel survey that formerly generated this data had been cancelled a few years previous. Industry representatives reminded the Council that this fishery has only just begun to be prosecuted by Canadians year round and that much of the 1999 fishery was directed for a fresh market in Spain, requiring timing the fishery to the availability of air transportation and markets. The representative from the Silver Hake Advisory Committee (SHAC) called for DFO to reinstate the RV survey to adequately assess silver hake. The SHAC also recommended that the FRCC advise the Minister to set the TAC at 30,000t for 2000-2001. The FRCC recommended DFO/industry workshop which took place in 1999, concluded with a decision to change to a 55 mm square mesh cod end replacing the 60 mm diamond mesh. The catch composition has seen fewer small fish and the split TAC of 15,000t of the 30,000t in the Basins was no longer valid from a management as well as scientific point of view. By-catches of other species posed no apparent problem.

## ANALYSIS & RECOMMENDATIONS

The 1999 Stock Status Report indicates that:

- Landings by Canadian vessels from Emerald and LaHave Basins are continuing to increase relative to catches from the offshore fishery.
- Changes in mesh type and size by the Canadian fleet appear to be reducing catches of small fish.
- Survey estimates of abundance and biomass show declines since the early 1980's.
- Independent estimates of total mortality for ages important in the fishery are above F0.1.
- There are long-term declining trends in the biological indices, with condition, mean length-at-age, and length at 50% maturity all at low levels relative to the long-term mean.
- The 1998 year class is above average in size, while the 1997 is below average.
- It would be prudent not to allow catches to increase from 1997-1999 levels.

Catches from the inshore fishery now make up more than half of the landings. Biomass and abundance increased in 1995 and 1996, but have decreased since. Recruitment is critical due to the fishery on young age classes (ages 2 – 4). Total mortality shows an increasing trend since 1995. Length-at-age is just below the long-term mean and condition is low compared to the long-term mean. Length-at-50%-maturity remains low compared to the long-term mean. A severe retrospective pattern reduces the reliability of the assessment. The Council is concerned that total mortality of this stock continues to increase, suggesting a high exploitation of the stock.

**1. The FRCC recommends that the TAC for 4VWX Silver Hake be set at 20,000t for 2000/2001.**

The fishery for silver hake depends heavily on very young fish (ages 2 – 4), for which there is not a long window of opportunity to develop recruitment information prior to their entry into the fishery. Prior to 1998, a standardized 0-group survey was conducted for this species, yielding valuable and early information about incoming recruitment. This survey was discontinued in 1998.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 100 | 100 | 100 | 120 | 135 | 135 | 100 | 105 | 75 | 30 | 45 | 46 | 50 | 55 | 30 |
| Catch | 75.48 | 82.68 | 61.71 | 74.37 | 87.99 | 69.73 | 171.3 | 51.23 | 29.76 | 8 | 17.2 | 26.4 | 16.9 | 16.06 | 11.61 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

**2. The FRCC recommends that the 0-group survey be re-instated or that alternative survey methodologies be developed and implemented to increase recruitment information in this stock.**

## HISTORY OF FRCC RECOMMENDATIONS

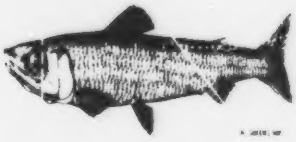
In June 1994, the NAFO Scientific Council calculated that the catch at F0.1 for 1995 would be 79,000t. However, they noted that this calculation could be overestimated by as much as 20,000t. The Council recommended that the 1995 TAC for 4VWX silver hake be set at 60,000t. In order to reduce by-catches, the Silver Hake Box was redrawn in 1994 to move its northern boundary into deeper waters. Mandatory use of the Nordmore grate was also imposed in 1994. In November 1995, the Council recommended that the 1996 TAC for 4VWX silver hake remain at 60,000t. In October 1996 the FRCC recommended that the 1997 TAC for 4VWX silver hake be reduced to 50,000t. For 1998, the Council recommended that the 1998 TAC for 4VWX Silver Hake be set at 55,000t. The Council also recommended that the by-catch of groundfish continue to be monitored to ensure that there be no adverse impact on these resources, and the decrease in condition factor be monitored.

For 1999, the Council recommended that the 1999 TAC for 4VWX Silver Hake be set at 30,000t, and that no more than 15,000t of the 30,000t TAC be taken from the Emerald and LaHave Basins to minimize the catch of juveniles.The Council recommended that as a high priority, DFO/industry conduct a joint workshop to explore methods to spread the catch more evenly across the age groups in this fishery. Also, there were recommendations that the by-catch of other species, as well as the decrease in condition factor be monitored.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | downward trend |
| | *Compared to average* |
| Spawning biomass: | likely average |
| Total Biomass: | likely average |
| Recruitment: | 96 year class above average; 97, below average, concerns that cold water incursion on Scotian Shelf may have negative effect on this year's recruitment, however 98 year class is above average |
| Growth and Condition: | long-term declining trends in biological indices with condition, mean length-at-age, and length with 50% maturity all at low levels relative to long-term mean. |
| Age Structure: | few year classes but typical for this species |
| Distribution: | no apparent change in distribution |
| Recent Exploitation: | uncertain |

# ARGENTINE - 4VWX



## 1999 CONSULTATIONS

No comments were received about this stock during the public consultations in Nova Scotia in November and December 1999.

## ANALYSIS & RECOMMENDATIONS

Since no assessment of this stock was done in 1999, a new Stock Status Report was not produced. Scientific information is from the 1996 Stock Status Report.

The 1996 DFO Stock Status Report indicates that there is too little known about this stock component to generate sufficient data for analytical purposes. Given the by-catch nature of this fishery and the low catches in recent years, the Council believes that the 1999 TAC can continue to be set at 1,000t, as a precautionary measure, and has not changed its outlook on this stock.

**1. The FRCC recommends that the TAC for 4VWX argentine be set at 1,000t in 2000/2001.**

**2. The FRCC recommends that if this fishery is pursued in a commercial fashion, there be a requirement for a scientifically based data collection component to improve knowledge about the resource.**

## HISTORY OF FRCC RECOMMENDATIONS

Catches from this stock, which are taken as by-catch in the silver hake fishery, have not exceeded 360t since 1983. In November 1993, the Council recommended that, as a precautionary measure, the 1994 TAC for argentine in 4VWX be set at 1,000t. The TAC was set at that level for 1994. In 1994, the Council recommended that the 1995 TAC for 4VWX argentine be set at 1,000t and this recommendation was repeated for 1996, 1997, 1998 and 1999.

The Council further recommended for 1998 and again for 1999 that if this fishery is pursued in a commercial fashion, there be a requirement for a scientifically based data collection component to improve knowledge about the resource.

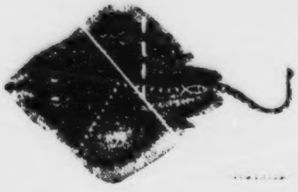
Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 1 | 1 | 1 | 1 | 1 | 1 |
| Catch | 0.29 | 0.2 | 0.08 | 0.35 | 0.11 | 0.22 | 0.14 | 0.03 | 0.13 | 0 | 0.11 | 0 | 0 | 0 | 0 |

*Catch as of Nov 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

# SKATES - 4VsW



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney, Nova Scotia (November 30) and Halifax, Nova Scotia (December 2). There were no directed comments on these stocks. Written briefs recommended status quo.

## ANALYSIS & RECOMMENDATIONS

The 1998 Stock Status Report and 1999 Groundfish Update indicate that:

- Landings in the directed fishery have ranged from 2,152t in 1994 to less than 1,000t in 1998, while by-catch estimates have declined from greater than 2,100t in 1990 to less than 100t in 1997.
- Commercial catch rates have revealed no significant changes since the beginning of the directed fishery.
- Removals from the fishery peak between 70 to 75cm. There has been a progressive reduction in winter skate greater than 90cm since 1995. Female winter skate mature at 75cm.
- Overall survey abundance in Division 4VsW is at very low levels, while the slope strata indices in Division 4VsW have increased.
- Total mortalities doubled from 1995 to 1997 and remain high.
- Current harvest levels in the 'developing' fishery are not sustainable.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that the TAC for 4VSW skate be set at 600t in 2000/2001, including by-catches.**

**2. The FRCC recommends that the experimental fishery should continue to provide the basis for improved assessment and management in the future.**

**3.The FRCC recommends that measures be implemented to diversify size and species of skates in the catch.**

## HISTORY OF FRCC RECOMMENDATIONS

In 1994, a combination of closures of traditional groundfish fisheries on the Scotian Shelf and openings in the markets for skate wings resulted in the development of a directed Canadian skate fishery. In 1994, a preliminary TAC of 1,200t was established with an additional 800t allocated to joint industry/science surveys. The 1994 catch accounted for 3,100t, including by-catch in non-directed fisheries. The 1995 directed fishery was regulated by a 1,600t TAC, with an additional 20% by-catch allowed in the directed flatfish fishery. In 1996, the TAC was lowered to 1,200t, with an additional 20% by-catch allowed in the directed flatfish fishery. In October 1996, the FRCC recommended that the 1997 TAC for 4VsW skates be again set at 1,200t, including by-catch, and measures be implemented to diversify size and species of skate in the catch.

For 1998, the FRCC repeated its recommendations that the 1998 TAC for 4VsW skates be set at 1,200t, including by-catch and that measures be implemented to diversify size and species of skate in the catch. The Council also recommended that the experimental fishery continue at a similar level of fishing effort in 1997.

For 1999, the FRCC recommended that the 1999 TAC be reduced by one-half to 600t following the 1998 assessment suggested that the 1,200t was not a sustainable level of catch.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | 2 | 1.6 | 1.6 | 1.2 | 1.2 | 0.8 |
| Catch | | | | | 3.8 | 5 | 4.3 | 2.3 | 2.1 | 3.1 | | 1.8 | 1.04 | 0.44 | 1.21 |

*Catch as of Nov. 19/99

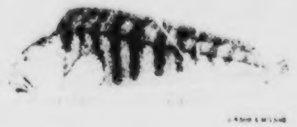
1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

Overall Stock Indicator:

| | *Compared to average* |
|---|---|
| Spawning Biomass: | no particular observation |
| Total Biomass: | below average (thorny skates) |
| Recruitment: | below average |
| Growth and Condition: | size declining |
| Age Structure: | below average |
| Distribution: | below average |
| Recent Exploitation: | unsustainable |

# WOLFFISH - 4VWX



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney (November 30), Shelburne (December 1), and Halifax, Nova Scotia (December 2). There were no directed comments on this stock.

## ANALYSIS & RECOMMENDATIONS

No assessment of this stock has been conducted since the 1996 Stock Status Report.

It appeared that the concentrated fishing effort in 4X on this species has likely contributed to overall decline. As well, scientists believe that catches in excess of 600t in 1997 would not likely be sustainable.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that there be no directed fishery for wolffish in 4VWX in 2000/2001.**

**2. The FRCC recommends that restrictive by-catch measures should be implemented to minimize by-catches in all fisheries directed at other species.**

## HISTORY OF FRCC RECOMMENDATIONS

With the limited information available in 1995 on which to base a firm recommendation, the Council recommended a precautionary TAC for 1996 at 600t.

Since 1997, the FRCC has recommended that catches should be limited to the historical levels consistent with the truly by-catch nature of this fishery, with sufficient flexibility to avoid closing traditional directed groundfish fisheries.

Figures are in 000t

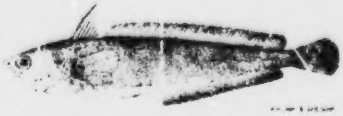
| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | | | | | |
| Catch | | | | | 0.6 | 0.6 | 0.5 | 0.7 | 0.6 | 0.4 | 0.24 | 0.6 | 0.6 | 0.3 | |

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | low |
| | *Compared to average* |
| Spawning Biomass: | low, declining in 4VWX |
| Total Biomass: | low, declining in 4VWX |
| Recruitment: | near average, small fish in 4X |
| Growth and Condition: | below average |
| Age Structure: | poor |
| Distribution: | average |
| Recent Exploitation: | no particular observation |

# WHITE HAKE - 4VWX5Zc



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney, Nova Scotia (November 30), Shelburne, Nova Scotia (December 1), and Halifax, Nova Scotia (December 2). Participants questioned the appropriateness of the broad management area for this stock and suggested that there may be distinct subcomponents of white hake.

## ANALYSIS & RECOMMENDATIONS

The 1998 Stock Status Report and 1999 Groundfish Update indicate that:

- Total landings have declined since 1995, and landings in 1998 were the lowest since 1968.
- Commercial catch rates declined since 1996 for all major fleets (longliners, gillnetters, trawlers), with 1998 demonstrating the lowest catch rates.
- Research vessel survey abundance estimates from Canadian (summer 4VWX, spring 4VsW, spring Georges Bank) and US (spring and fall offshore) sources are all near record lows.
- The size composition of the summer research vessel survey catches in 4X has been getting smaller since 1995, and mean weights of individual fish in 4VWX surveys have been declining since 1984.
- Mortality rates for 4X white hake derived from summer research vessel survey data depict exploitation at or above 50% throughout the 1990's.
- The 4X5Zc portion of the stock may be at risk of collapse.
- The stock structure is complex.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that there be no directed fishery for white hake in 4VWX5Zc in 2000/2001.**

**2. The FRCC recommends that there be a restrictive by-catch fishery only; measures should be implemented to minimize by-catches of this stock in all fisheries directed towards other species. In addition, consideration should be given by DFO in consultation with industry, to the establishment of incremental conservation measures.**

The FRCC recognizes that the stock structure of white hake in 4VWX5Zc may be complex. Fishermen have long argued that stock components are in fact entirely separate stocks.

**3. The FRCC recommends that DFO Science in conjunction with industry undertake a genetics testing program including white hake from 4T to assist in identifying potential stock subcomponents and refined management delineation.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1995, the Council recommended that the 1996 TAC for 4VWX white hake be set at 2,500t.

In October 1996, the FRCC recommended that the 1997 TAC for 4VWX5Zc white hake be increased to 3,500t with flexibility to avoid closing traditional directed groundfish fisheries. The Council added that, for assessment purposes, separation of management units 4VW and 4X5Zc should be implemented and, given the belief that the western stock (4X5Zc) is transboundary, this stock be included in the bilateral consultations on groundfish with the U.S. with the objective of developing a joint management strategy.

For 1998, the FRCC re-iterated its 1997 recommendations and further recommended that as an immediate priority, DFO Management/Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy). If the result of this review indicates potential adverse affect

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | | 2 | 3.5 | 3.5 | 0 |
| Catch | | | | | 3.4 | 3.7 | 2.9 | 3.4 | 3.6 | 3.1 | | 2.9 | 2.86 | 1.49 | 2.06 |

*Catch as of Nov. 19/99

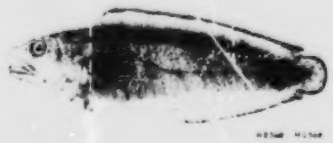
1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

on local aggregations or spawning components, measures should be put in place to protect this resource.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low |
| | *Compared to average* |
| Spawning biomass: | very low |
| Total Biomass: | very low |
| Recruitment: | unknown |
| Growth and Condition: | declining since 1984 |
| Age Structure: | unknown |
| Distribution: | stock structure complex, not well understood |
| Recent Exploitation: | very high in mid-1990's |

# CUSK - 4VWX



## 1999 CONSULTATIONS

The FRCC held consultations with stakeholders in Sydney, Shelburne, and Halifax, Nova Scotia, (November 30-December 2) to gather industry feedback. Written briefs submitted recommended the status quo for this stock.

## ANALYSIS & RECOMMENDATIONS

The 1998 Stock Status Report and 1999 Groundfish Update indicate that:

- Landings in 1998 were 1457t, landings have remained below the long-term mean of 3469t since 1993.
- Research vessel survey mean weight per tow declined abruptly in 1992 and has remained below the long-term mean of 1.29 kg since that time. The 1998 value is the lowest in the survey history.
- The cusk stock has collapsed since 1992.
- Research vessel survey catches have shown a restriction of distribution to the western portion of 4X.
- Future catches should be substantially reduced and measures should be undertaken to conserve and rebuild the cusk stock.
- An essential requirement of rebuilding the cusk stock is the accurate recording of the location of all catches.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that there be no directed fishery for cusk in 4VWX in 2000/2001.**

A restrictive by-catch will aid in rebuilding efforts.

**2. The FRCC recommends that restricted by-catch measures should be implemented to minimize by-catches in all fisheries directed at other species.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1995, the Council recommended that the 1996 TAC for 4VWX cusk be set at 1500t.

In October 1996, the FRCC recommended that the 1997 TAC for 4VWX cusk should not exceed historical catch levels, with sufficient flexibility to avoid closing traditional directed groundfish fisheries. This recommendation was repeated for 1998 and again for 1999.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | | 1.5 | 0 | 0 | 0 |
| Catch | | | | | 2.7 | 3.1 | 3.8 | 4.2 | 2.3 | 1.5 | 1.8 | 0.85 | 1.3 | 1.13 | 1.63 |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | low |
| | *Compared to average* |
| Spawning Biomass: | low |
| Total Biomass: | historical low |
| Recruitment: | no sign |
| Growth and Condition: | poor |
| Age Structure: | below average |
| Distribution: | no significant change |
| Recent Exploitation: | no particular observation |

# MONKFISH - 4VWX

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Sydney (November 30), Shelburne (December 1), and Halifax, Nova Scotia (December 2). There were no stakeholder comments on this stock. Written briefs recommended status quo.

## ANALYSIS & RECOMMENDATIONS

Scientific information here is from the 1996 Stock Status Report and the 1999 Groundfish Update.

Historically, monkfish have been almost exclusively a by-catch of groundfish and scallop fishing. Between 1992 and 1994, the less than 65 ft. mobile fleet directed for monkfish in 4X. Consequently landings in this area increased from just over 300t in 1991 to 1,100t in 1994. Abundance is highest in central Scotian Shelf and in the inshore areas of west of 4W. This is a shared resource with the U.S. where the fishery is essentially unregulated. The U.S. survey shows the resource is over exploited. There is no evidence of large scale migration of this stock and there appear to be discrete spawning components in Canadian waters. Consequently, the stock may be managed successfully by Canada with 5Zc included in the management area.

There is a joint industry/science five year program to improve knowledge of the resource being conducted by five-mobile gear vessels less than 65 feet. They are conducting a directed fishery in Georges Basin for 200t in co-operation with DFO. There is no biological basis to date for establishing a TAC. DFO Science recommends that catches be maintained at a low level and that the five-year research program be continued.

Scientists suggested that catches be limited to less than 800t, the average landing since 1988. The 1996 Stock Status Report confirms that the biomass remains low and catch levels in the order of 800t continue to be suggested.

The FRCC has not changed its outlook on this stock.

**1. The FRCC recommends that there be no directed fishery for monkfish in 4VWX in 2000/ 2001.**

**2. The FRCC recommends that restrictive by-catch measures should be implemented to minimize by-catches in all fisheries directed at other species.**

**3. The FRCC recommends that the joint industry/DFO science program on Georges Basin be continued.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1995, the Council recommended that the 1996 TAC for 4VWX monkfish be set at 700t.

For both 1997 and 1998, the FRCC recommended that the TAC for 4VWX monkfish should not exceed historical levels, with sufficient flexibility to avoid closing traditional direct groundfish fisheries. The Council also recommended that monkfish be treated as a by-catch in all other fisheries and the joint industry/ DFO science five year program should be continued.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | | 0.7 | 0.2 | 0 | 0 |
| Catch | | | | | 0.6 | 0.8 | 0.8 | 0.8 | 0.6 | 1.2 | | 0.71 | 1.2 | 0.66 | 1.67 |

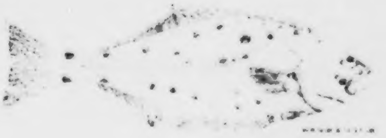
*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | below average |
| | *Compared to average* |
| Spawning Biomass: | below average |
| Total Biomass: | below average (declining) |
| Recruitment: | mixed average in 4X, below average in 4VW |
| Growth and Condition: | no particular observation |
| Age Structure: | no particular observation |
| Distribution: | average |
| Recent Exploitation: | above average |

# ATLANTIC HALIBUT - 3NOPs4VWX5Zc



## 1999 CONSULTATIONS

In its January 2000 report, the FRCC reported that: "The Council has decided to defer its recommendations for 2000 on Atlantic halibut until it has had data from the industry/DFO longline survey presented to it. This initiative is too important for the Council to ignore."

The FRCC held public consultations on this stock in Nova Scotia in Sydney on November 30, 1999, Shelburne on December 1, and Halifax on December 2. The results of the industry/DFO longline survey were presented in workshops in Shelburne on January 20, 2000 and in Halifax on January 27: FRCC members attended these workshops. Following these, the FRCC held a special consultation session in Halifax on February 9. A number of written briefs commented on the state of this resource, and recommended TAC levels for this fishery from a slight increase to the current 850t, up to 1,600t.

Participants in Sydney were critical of the industry/DFO longline survey, reporting that there were survey stations where halibut are known not to be found, as well as a lack of stations in traditional halibut areas (e.g., 4Vn, St. Paul's area). Participants at consultations also acknowledged the changes initiated in January 2000 to the halibut conversion factor; however, they also criticized the lengthy delay before these changes were finally made.

The special consultation session in Halifax brought forward information that followed an analysis of the second year's data from the DFO/industry longline survey. Industry participants were consistent in reporting large numbers of halibut and good catch rates in the commercial fishery, citing these as indications of improved abundance of halibut. Participants also recommended that by-catches caught in the industry/DFO longline survey not be counted against the TACs for these stocks.

## ANALYSIS & RECOMMENDATIONS

The 1997 Stock Status Report (last full assessment) indicated that:

- Abundance is low compared to previous years; declines have been more evident for the southern Grand Banks than Scotian Shelf.
- Total mortality (fishing and natural) seems to have increased.
- There is a reduced range of sizes in the population.
- Halibut-directed CPUE down since 1988; some indications of increase in 1996.
- "Present restrictive measures should be continued."

The FRCC continues to note that the Stock Status Report and the information from fishermen are not compatible for this stock. The last assessment for this stock was done in 1997. This assessment, based on the DFO research vessel (RV) survey, indicates that abundance estimates are low and that halibut catches show reduced size ranges. It was noted that restrictive management regulations do not allow one to judge the status of the stock based on commercial catch rates.

Industry participants confirm DFO's view that the resource status is not accurately reflected by the current RV survey. They report increased abundance in both the commercial portion of the industry/DFO longline survey and in the limited commercial fishery that they are able to prosecute with the available quota. The DFO RV survey does not cover depths beyond 200 fathoms. Industry fishing experience has demonstrated that good catches of large halibut occur in depths from 200-400 fathoms.

In addition, the RV survey does not cover the entire geographic range of this stock, in particular the Bay of Fundy area, and the Grand Banks. Exclusion of the Grand Banks is a key deficiency because it is believed that the larger fish are resident there and their exclusion may overstate the mortality calculation for the resource. Catchability of halibut in the DFO RV survey is also an issue with fishermen since the gear is not well suited to catch halibut.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 1.5 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Catch | 4 | 3.3 | 2.6 | 2.3 | 1.9 | 2.1 | 2.2 | 1.30 | 1.2 | 1.04 | 0.72 | 0.79 | 1.16 | 0.82 | 0.81 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

The Council raised the issues of the adequacy of coverage by the industry/DFO longline survey with DFO scientists. Scientists reported that they are satisfied that the design of the survey adequately addresses these issues. While not all areas of the stock range are covered every year, it is the intent of the survey participants and of DFO Science to sample all areas periodically. The Council also notes that it is encouraged by industry and DFO implementation of the FRCC recommendation to conduct this new survey. It commends these cooperative efforts of the industry and of the scientists.

**1. The FRCC recommends that the industry/DFO longline survey be continued with sufficient observer coverage to ensure its integrity.**

**2. The FRCC recommends that aging of the population be given priority.**

**3. The FRCC recommends that DFO, in consultation with industry, develop an Atlantic-wide protocol to address TAC and commercial quota issues related to removals of targeted species and bycatch species arising from all industry/DFO surveys. Until such a protocol is developed, removals of halibut and bycatch species should continue to be addressed as in the past, i.e. the catches of Atlantic halibut from the industry/DFO longline survey are to be in addition to the TAC.**

**4. The FRCC recommends that DFO incorporate into the industry/DFO longline survey:**

- **a. initiatives to evaluate mortality/survival rates of halibut caught and released in this fishery; and,**
- **b. initiatives to determine the appropriate size of larger female halibut that might be caught and released as part of a future management plan.**

The Council is, once again, confronted with conflicting views of resource status. In light of the problems in the DFO RV survey noted above and the observations of industry based on their experience in the commercial fishery, the Council has decided to recommend an increase in the TAC from 850t to 1,000t for 2000/2001. It is the Council's view that this increase, while not approaching levels requested by industry, recognizes fishermen's observations about this resource. The increase is not, in Council's view, enough to negatively impact the resource.

**5. The FRCC recommends that the TAC for 2000/2001 for 3NOPs4VWX5Zc Atlantic halibut be set at 1,000t.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council recommended that the 1994 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 1,500t as a precautionary measure. The Council also recommended that the mandatory landing provisions be reviewed with the aim of allowing halibut smaller than 81 cm (32 inches) to be released. This was implemented in 1994 and remains a critical component of the FRCC recommendation for this stock. In 1994, the Council recommended that the 1995 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 850t as a precautionary measure. The Council recommended also that mandatory landing provisions be reviewed

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | fair |
| | *Compared to average* |
| Spawning biomass: | unknown |
| Total biomass: | unknown |
| Recruitment: | indications of incoming recruitment |
| Growth/Condition: | no reliable information |
| Age structure: | unknown |
| Distribution: | appears to be widely distributed |
| Recent exploitation: | unknown |

regarding the discarding of incidental catches of halibut smaller than 32 inches. In November 1995, the Council recommended that the 1996 TAC for Atlantic halibut remain at 850t with the same small halibut release provision.

In October 1996, the FRCC recommended that the 1997 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 850t, and that the provision for the release of halibut smaller than 81cm be maintained. In addition to this recommendation the Council asked that a joint DFO/industry study be conducted to assist in the overall assessment process, such as appropriate biological sampling, a tagging/movement component, identification of stock sub-components and identification of alternative survey indices. The Council reiterated these recommendations for 1998 and for 1999.

For 1999 the Council also recommended that DFO Science investigate the biological link of Atlantic halibut in 3Pn (not currently included as part of existing management units) to adjacent stocks in management units 4RST and 3NOPs4VWX5Zc.

### WRITTEN BRIEFS RECEIVED BY THE FRCC FOR ATLANTIC HALIBUT IN 3NOPS4VWX5ZC

Scotia Fundy Inshore Fishermen's Association – Evan Walters, Executive Director (FRCC.99.GR.SF.6)

Inshore Fisheries – Claude d'Entremont (FRCC.99.GR.SF.8)

Shelburne County Competitive Fishermen's Association – Pam Decker (FRCC.99.GR.SF.9)

Shelburne County Fixed Gear Quota Group – Gary Dedrick, President (FRCC.99.GR.SF.10)

Eastern Shore Fishermen's Protective Association (FRCC.99.GR.SF.14)

Halifax West Commercial Fishermen's Association – Sam Elsworth (FRCC.99. GR.SF 17)

<45' Shelburne County Fixed Gear Quota Group – Gary Dedrick, President (FRCC.00.GR.AH.1)

Halifax West Commercial Fisherman's Association – Nick Henneberry (FRCC.00.GR.AH.2)

# Redfish Unit 1 - 4RST+3Pn (Jan-May)+4Vn (Jan-May)

## 1999 Consultations

The FRCC's public consultations on redfish stocks were held in a number of locations in November and December 1999. An Atlantic-wide consultation was held in Halifax on December 2, 1999. There were few comments on this stock received from industry during these consultations. Industry generally holds the view that the stock remains in a relatively poor condition; abundance appears to be lower than levels of the early 1990's despite the closure that has been in effect. There were virtually no comments expressed on whether there should be any change of approach to the index fishing regime implemented in 1999. From written briefs, there were representations to the effect that Units 1 and 2 should be combined with a total TAC of 12,000t, and adjustments should be made to seasonal fishing patterns.

## Analysis & Recommendations

A redfish multidisciplinary research program has been conducted over recent years. This program has included a study of stock affiliations between and within current redfish management units. Follow up investigations will proceed in 2000. The Stock Status Report for 1999 was developed on the basis of stock unit boundaries as they currently exist. The 1999 DFO Stock Status Report indicates:

- The biomass is stable at low levels since 1995.
- There is no sign of strong incoming recruitment. The 1996 year class is the most abundant observed for the last 6 years: it is substantially less abundant than the 1988 year class. The majority of these fish are *S. fasciatus*, as was also the case with the 1988 year class. If year class disappearance is species related, then the 1996 year class may also fade away before attaining adult size.
- Distribution remains relatively restricted; concentrations are found mainly in the Cabot Strait area in Division 4R and sub-division 3Pn. There are indications that the Fall migration of redfish out of the Gulf may be occurring earlier in the year than was previously the case.
- The results of recent studies indicate there were no differences in the genetic profile of populations in Units 1 and 2 for both redfish species (*S. fasciatus* and *S. mentella*), as well as with the hybrid that is found only in these areas. These studies imply that interbreeding occurs but it is not known what the rate of any 'mixing' would have to be in order to achieve these results. The implications of this mixing in relation to management of the respective stocks are still unclear.

The Council remains concerned about the status of this stock, which apparently has not yet started to recover. While the 1996 year class (*S. fasciatus*) may be stronger among the more recent year classes, it does not appear to be as strong as other year classes which have contributed to the fishery in the past, and it is not known whether this year class will disappear prior to attaining adult size, as was the case with the 1988 year class (*S. fasciatus*). Regardless, whenever a significant year class event does take place, it will take 10 years before these fish will be available to the commercial fishery. An added concern this year relates to indications that predation by seals may have tripled since the 1970s, reaching very significant levels.

**1. The FRCC recommends that there be no directed commercial fishery for Unit 1 Redfish in 2000/2001.**

The Council believes that important information on this stock has been collected through joint industry/science initiatives, as well as through the re-establishment of the commercial fishery index through the limited fishery that was recommended and approved in the past two years. These activities should continue in order to generate information that may be used to supplement that which is obtained through DFO's annual research survey. While the intention of the Council is to have an on-going evaluation of the stock, Données en 000t

| Année | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 50.6 | 55.6 | 55.6 | 56.6 | 57 | 57 | 57 | 67 | 60 | 30 | Moratoire | | | | |
| Prises | 35.1 | 36.4 | 43.4 | 51.9 | 55.2 | 63.8 | 68 | 77.4 | 51.8 | 19.8 | 0.02 | 0.02 | 0.02 | 0.30 | 1.01 |

*Prises de 1999 au 19 nov/99

1 Figures prise du Plan de gestion intégrée de la pêche du poisson de fond de l'Atlantique

in part through the index fishery, it may not be appropriate to do so with an annual TAC level of 2,000t and/or by conducting this effort every year. The Council intends to solicit views on this matter prior to making its recommendations for 2001/2002.

**2. The FRCC recommends continuation of the joint industry/science survey program, substantively as it was designed for 1999, including both a fully scientific component and a component to re-establish the commercial catch rate index; Participation in this program should continue to emphasize those who have historically fished this stock and whose catches were used to determine the commercial catch rate index. The level of quota allowed for these purposes in 2000/2001 should be 2,000t.**

The Council notes the preliminary results of the Redfish Multidisciplinary Research Program as making a significant contribution to the understanding of the various redfish stocks in Atlantic Canada. The recent Stock Status Report articulates a number of important issues that arise from this Program; the requirement for follow-up investigation is clear. Of particular interest in relation to Unit 1 Redfish includes the need to confirm the impact of seal predation, and the need to clarify questions and implications associated with apparent stock mixing between Units 1 and 2.

**3. The FRCC recommends that DFO Science Branch bring together scientists, industry and managers to identify and prioritize work that needs to be undertaken as follow-up to the results of the Redfish Multidisciplinary Research Program. This initiative should be undertaken, and sufficient human and financial resources should be brought to bear, with the objective of incorporating results into future management of the various stocks as soon as possible.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council expressed its concern about this stock and recommended that the **1994** TAC be set at 30,000t (a 50% reduction) with the view to keeping it at this level for the following two years, if at all possible, to achieve stability.

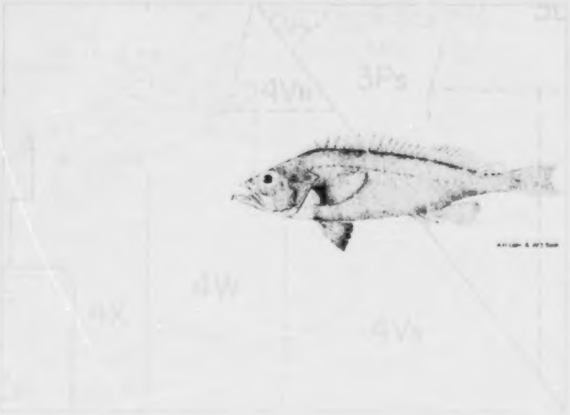
In its 1994 report, the Council recommended, for Unit 1 redfish, that current scientific work be strengthened and elaborated in co-operation with the industry so as to clarify redfish management units, as well as to better understand migration patterns and stock status and that the **1995** TAC be set at 7,500t. As well, the Council recommended that a small fish protocol be established to protect juvenile redfish; and that Fisheries and Oceans, in consultation with industry stakeholders, limit the fishery as much as practical during the January to June period. The Minister considered the FRCC TAC recommendation but concluded that no fishery for Unit 1 redfish should occur in 1995. Further to the Council's recommendation for a joint industry/science initiative for redfish, a multi-disciplinary research program was developed jointly with industry stakeholders and DFO in an attempt to address key questions related to redfish biology, stock definition and migrations, and stock status. For **1996**, and again in **1997**, the FRCC recommended continuing the moratorium and minimizing the by-catch of redfish in other fisheries. In 1997, the FRCC also recommended that cooperative industry science surveys take place.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Condition: | stable at a low level |
| | *Compared to average* |
| Spawning & Total Biomass: | stable at a low level |
| Recruitment: | very low |
| Growth and Condition: | average, similar to other redfish stocks |
| Age Structure: | poor |
| Distribution: | relatively restricted |
| Recent Exploitation: | low, approximately 2% of survey biomass |
| Natural Mortality: | may be higher than previously accounted for |

For **1998**, the Council once again recommended that no directed commercial fishery take place. The FRCC further recommended that a joint industry science sentinel survey be established, on an ongoing basis, to include both a fully scientific component and a component to re-establish the commercial catch rate index. It was recommended that catches for this program not exceed 1,000t. Continuation of this Program was recommended for **1999**, with the level of available quota being increased to 2,000t in order to improve the validity of the CPUE index. The Council requested that DFO Science Branch identify what changes might be needed with respect to boundaries of the Units 1 and 2 stock management areas.

# REDFISH UNIT 2 - 3PS4VS4WFG+3PN4VN (JUN-DEC)



## 1999 CONSULTATIONS

The FRCC's public consultations on redfish stocks were held in a number of locations in November and December 1999. At Harbour Breton, participants expressed disappointment with the quality of the scientific information and disagreed with the conclusions drawn by DFO Science Branch. They stated there was a need to improve the resources available to redfish science. Plant workers expressed the view that redfish in their area were very plentiful, of a good size, and that the catch rates were constant at a high level.

At the Atlantic-wide consultation held in Halifax on December 2, 1999, all participants reiterated views of the previous year, indicating catch rates and relative availability continue to be positive and that the condition of this stock appears to be quite healthy. Despite the emphasis of the fishery on the 1980 year class for market reasons (i.e. larger fish), there were indications of a broader size mix (i.e. more recent year classes) being available in other concentrations that were not being fished for size/market reasons.

There was an industry presentation comparing length frequencies and parasite loads associated with catches from various sub-areas within Unit 2 as well as between these sub-areas and 4Rd. Their results indicated the 4Rd redfish were not well 'aligned' with characteristics of redfish from 3Ps and 4Vs, where the redfish are larger, and there appears to be at least two size components of redfish in each of 4Vs and 3Ps.

There were unanimous and strong representations that DFO's dedicated redfish survey (that last operated in 1997) be reinstated. It was asserted that the public had been "duped" by DFO who had rationalized cutting the frequency of the survey back to every second year ( i.e. skipping 1998) based on redfish being a slow growing species. Now that the 1999 survey had also been cancelled, it is perceived that this survey will never return. It was stated that the GEAC survey had been introduced by industry, as a supplement rather than as a potential replacement for the DFO survey. It was also noted that the scientists' emerging uncertainty regarding the strength of the 1988 and 1994 year classes was a direct result of the inability to properly monitor smaller fish now that the DFO survey had been absent for two years. Through the course of the meeting, it was also noted with disappointment that DFO did not have the resources to track and analyze parasite loads and male/female length frequencies by sub-area.

## ANALYSIS & RECOMMENDATIONS

A redfish multidisciplinary research program has been conducted over recent years. This program has included a study of stock affiliations between and within current redfish management units. Follow up investigations will proceed in 2000. The DFO Stock Status Report for 1999 was developed on the basis of stock unit boundaries as they currently exist; it indicates that:

- The 1999 biomass estimate, based on the GEAC survey, is half of previous estimates, but a high variability in survey estimates is not unusual.
- The strength of the 1988 year class is not as strong as the 1980 year class that has been sustaining the fishery for the past nine years.
- The total available adult population is expected to decline as the yield available from the 1988 year class is not expected to be as large as that of the 1980 year class, and renewed monitoring of the 1994 year class is required to establish strength.
- Consideration should be given to a reduction in catches in the next fishing year (2000/2001) in response to this anticipated decline.

The SSR's suggestion that consideration be given to a possible reduction in catches essentially relates to a stock management question of how fast the available yield should be drawn upon, particularly now that the expected strength of the 1988 year class has been adjusted downwards, as it now appears lower than previously thought. Generally, this was a matter that the FRCC raised and addressed in our Report last year, when we recommended that DFO Management Branch

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 18 | 18 | 18 | 15 | 15 | 10 | 15 | 25 | 28 | 25 | 14 | 10 | 10 | 11 | 12 |
| Catch | 11.5 | 9.7 | 14 | 10.7 | 15.3 | 15.8 | 23.8 | 24.6 | 27 | 24.1 | 12.4 | 9.3 | 9.6 | 9.74 | 10.29 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

lead a working group including scientists and industry to develop a management approach for Atlantic Canadian redfish stocks: "In order to manage on a multi-year basis, or even to be secure in the knowledge that the suite of annually set TAC levels represent the intended approach to management of the respective redfish stocks, the Council believes that every effort must be made to establish reasonable goals, to calculate total or at least comparable biomass estimates for the management units, and to establish an appropriate exploitation (harvest) rate(s) that balances recruitment pulses with stability objectives." It is disappointing that this recommendation was not implemented by the Department. Information contained in the recent Stock Status Report emphasizes the need to move forward with an effective, longer-term management strategy for this stock.

In order to ensure that this previously recommended action moves forward, the Council will undertake to solicit the views of scientists, industry and managers for the purpose of generating a collective view on an appropriate longer-term management strategy for Unit 2 redfish, targeted for implementation in the year 2001/2002.

In light of the highly intermittent recruitment patterns often associated with this slow growing species, the selection of a specific TAC level in a given year is somewhat arbitrary. In the absence of a longer- term management strategy, the selection of a specific TAC can only be reasonably justified as a 'directional' signal. A key aspect of such a strategy is the extent to which industry and managers might agree to 'draw down' from the fishable biomass that would be projected to be available over the years between recruitment pulses, and whether or how this approach might 'fit' in the context of a general objective to strengthen the age structure in the population. The 1,000t increase in the TAC last year was characterized as a cautious, and interim approach towards an increase that appeared to be justified in the context of the good recruitment associated with the strong 1988 and 1994 year classes. The SSR now indicates that previous estimates of at least the 1988 year class strength were too high. While industry confirms the presence of the 1988 year class in various areas throughout the stock range, at least some observe that its abundance does not appear to be as strong as that of the 1980 year class. It is interesting that the 1988 year class is primarily *S. fasciatus*, while the fisheries in this area were historically sustained by *S. mentella*. It is also interesting, if not somewhat disconcerting, that the 1988 year class that disappeared in Unit 1 was also *S. fasciatus*.

In essence, the FRCC is not hearing conflicting information between scientists and industry. Industry's experience with good catch rates and a healthy stock condition is based on their prosecution of what was a strong 1980 year class. However, no one will argue that there is a limit to what this 1980 year class will yield over time. It may be the case that this yield may be needed to augment the contribution that will be produced by the 1988 year class over time. Debate would reasonably center around how to manage uncertainties associated with the relative strengths of the 1988 and 1994 year classes, relationships with Unit 1 redfish, trajectories related to targets and limits for spawning stock biomass, etc. These are all issues that need to be

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Condition: | stable at healthy level |
| | *Compared to average* |
| Spawning Biomass: | healthy |
| Total Biomass: | healthy |
| Recruitment: | increasingly uncertain over actual strength of 1988 year class; early indications of the good 1994 year-class have not been updated. |
| Growth and Condition: | average; similar to other redfish stocks |
| Age Structure: | moderate |
| Distribution: | good; similar to previous years |
| Recent Exploitation: | moderate |

articulated within a longer term management strategy. Assuming an important objective for this fishery is to achieve reasonable stability in harvest levels, it is reasonable to reflect that the interim, directional increase would not have been recommended last year if the current scientific advice was available at that time. Consequently, and while it may only be able to be characterized as a directional adjustment made on an interim basis, it seems prudent to at least adjust direction based on the less optimistic information available this year, especially when viewed in the context of heightening levels of uncertainty.

**1. The FRCC recommends that the TAC for Unit 2 Redfish be set at 10,000t for 2000/2001.**

It is increasingly apparent that the postponement (or termination) of the DFO redfish survey in this area has been an impediment to the collective ability to understand the extremely important recruitment issue, quite apart from other issues associated with this stock. Responsible stock management depends on achieving and maintaining the ability to track the availability of year class strengths. Without this survey, DFO will have no independent ability to acquire and analyze 'compatible' stock indicators across the entire range of the stock; redfish scientists will remain dependent and vulnerable to information generated from different regional multi-species surveys that employ different systems. In addition, it is clear that industry views the apparent unilateral cancellation of this DFO survey as a breach of trust. The Council welcomes industry's increased interest and participation in various research activities in recent years, and is very concerned that a potential 'backlash' to DFO's decision may negatively impact on the future of this participation. Last year, the Council recommended that : "the DFO survey dedicated to redfish in this management unit be conducted in 1999; and that, as part of the winter 1999 workshop of redfish, recommendations (complete with detailed rationale) be forthcoming from DFO Science on the appropriate pattern and frequency redfish surveys in all management units". The reference to the winter workshop was a stated reference to the Redfish Multidisciplinary Research Program; this workshop was postponed and did not take place until November 1999. This workshop did not specifically address the Council's recommendation. Regardless of the forum, the intent of the Council was clear. **We are extremely disappointed that a decision was taken not to proceed with DFO's 1999 redfish survey: this decision was taken without the requested dialogue with either industry or the FRCC.**

**2. In order to ensure that the action we previously recommended moves forward, the Council recommends DFO Science Branch develop a comprehensive multiyear plan (complete with detailed rationale) for the various research activities necessary to address a prioritized list of information requirements related to management of Unit 2 redfish. The intention is for this plan to be evaluated in the context of development of a longer term management strategy.**

The results of the Redfish Multidisciplinary Research Program indicates there is a closer biological relationship between Units 1 and 2 than was previously thought to be the case, at least to the extent that linkages are reflected in the current management approach. It is important that Science Branch, in cooperation with industry and managers, proceed with due diligence to clarify existing information, identify and prioritize follow-up research, and provide guidance for future management of all redfish stocks, particularly in terms of the relationships between Units 1 and 2.

**3. The FRCC recommends that DFO bring together scientists, industry, and managers to identify and prioritize work that needs to be undertaken as follow-up to the results of the Redfish Multidisciplinary Research Program. This initiative should be undertaken, and sufficient human and financial resources should be brought to bear, with the objective of incorporating results into future management of the various stocks as soon as possible.**

Aside from the question of whether fundamental adjustments should be made to existing management units, consideration should be given to the efficacy of introducing refinements to management measures. The Council concurs with the observation that the movements of redfish, particularly in and out of 3Pn/4Vn, but also in the western portions of 3Ps, require further clarification and understanding. As an illustration, if redfish concentrations are indeed migrating out of the Gulf of St. Lawrence earlier than previously thought, then the Unit 2 fishery occurring in 3Pn in the Fall would include the catch of redfish from Unit 1. Similarly, if Unit 1 redfish migrate farther to the east of 3Pn and 4Vn in the winter months, then the Unit 2 fisheries in the western portions of 3Ps and 4Vs would include components of the fish from Unit 1. Consequently and while the existing area/seasonal closures should be maintained, these may not be sufficient to achieve the desired effect.

**4. The FRCC requests that DFO Science Branch conduct a targeted investigation of this**

**migration, drawing if possible upon available industry cooperation to design and implement a monitoring and measurement project, with the objective of concluding what additional management measures (if any) should be made to minimize fishing on concentrations that may contain redfish from both Units 1 and 2. It is intended that the results of Science Branch's investigation would begin to be reviewed by Council in the Summer of 2000, resulting in potential recommendations for the winter of 2001.**

**5. For the 12 month fishing year 2000/2001, and as an interim precautionary measure reflecting indications that there may be an earlier migration of Unit 1 redfish outside the Gulf, the FRCC recommends that the closure of redfish fishing in 3Pn and 4Vn be extended to include the month of October.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council recommended that the TAC for Unit 2 redfish be reduced from 28,000t to 25,000t in **1994**. In November 1994, the Council recommended that the TAC be set at 20,000t for **1995** and that a small fish protocol be established to protect juvenile redfish. The Council also recommended that no fishing be permitted in 3Pn and 4Vn during November and December and that scientific work clarify redfish management units and develop a better understanding of migration patterns and stock status. The Council recommended that the fishery be limited as much as practical during the January through June period to avoid taking fish that may, in fact, be fish from Unit 1. The Minister reduced the TAC to 14,000t for 1995 and implemented measures to avoid catching Unit 1 redfish when they could be mixed with redfish from Unit 2.

The Council recommended a TAC reduction to 10,000t for **1996** with: rigid small fish protocols, no fishing in 3Pn and 4Vn during November and December, and limiting, as much as possible, fishing from January to June. In **1997**, the FRCC recommended that the TAC remain at 10,000t, small fish protocols be continued and, DFO and Industry discuss the merits of protecting the 1988 year-class.

For **1998** the Council recommended that the TAC be set at 11,000t, seasonal and area closures be continued, and the small fish protocol be continued and rigorously enforced and DFO and industry discuss the merits of continuing to protect the 1988 year-class. The FRCC also recommended that DFO Science seek to determine a) the long term potential for this stock, and b) the historical profile of exploitation rates. The Council recommended that the **1999** TAC be set at 12,000t, that seasonal area closures be continued, that the DFO redfish survey in the area be re-instituted as part of an overall plan for redfish research surveys in all management areas, and requested Science Branch to identify what changes might be needed with respect to boundaries of the Units 1 and 2 management areas.

# REDFISH UNIT 3 - 4WDEHKLX

## 1999 CONSULTATIONS

Most discussion during public consultations in November and December 1999 focused on the shortfall in catches in relation to the available TAC. With the exception of one quota holder who expressed concern about the health of the stock, most comments indicated market conditions had a very significant impact on the harvest of this stock in 1999. It was stated that the reduced market demand for small redfish combined with the generally smaller size of redfish available from this management unit is diverting vessels away from many areas that they would have otherwise fished under normal market conditions, with catch rates being quite variable as a result. One participant noted that the presence of dogfish also had an impact on availability in 1999. Comments generally supported a status quo approach for the coming fishing year.

## ANALYSIS & RECOMMENDATIONS

A redfish multidisciplinary research program has been conducted over recent years. This program has included a study of stock affiliations between and within current redfish management units. Follow up investigations will proceed in 2000. The Stock Status Report for 1999 was developed on the basis of stock unit boundaries as they currently exist. The 1999 DFO Stock Status Report indicates that:

- Research vessel surveys indicate stability in the population biomass.
- Decreasing commercial catches reflect reduced demand for smaller size redfish, and are not a reflection of reduced abundance of the resource.
- There is no biological basis to suggest a need for change in the management of the resource at this time.

The Council recognizes and commends industry and DFO science for modifications implemented to the closed area to protect juvenile redfish (the 'Bowtie'), and acknowledges prevailing market conditions that reinforced efforts made to avoid small fish. However, this stock (*S. fasciatus*) consists of fish that are generally smaller than that found in Units 1 and 2, and a change towards more positive market conditions could reintroduce the potential for small fish to be exposed to the fishery.

**1. The FRCC recommends that the small fish protocol be consistently applied and rigidly enforced.**

The Council notes with concern the difference in by-catch rates between observed and unobserved vessels. While it is stated that data is too limited for extrapolation to the fleet concerned, the information points towards a potential problem with discarding.

**2. The FRCC recommends that at-sea observer coverage for the involved fleets be set at an appropriate level that enables managers to properly evaluate by-catches for observed versus unobserved vessels, and to take effective measures to address apparent discarding situations.**

The SSR concludes that the total population biomass is stable, with some indications of improved recruitment in some areas. DFO appears to concur with the majority of views expressed by industry in discounting the significance of reduced commercial catches. As was noted last year, the Council observes that not all the grounds available to the resource, and in particular those grounds deeper than 200 fathoms, are included in the survey. For this reason, the survey estimates should be expected to underestimate the true biomass by some extent. However, while this assumption can provide a positive 'buffer' in a general sense, the Council does not feel that this factor should be incorporated into any qualitative or quantitative assessment of harvest rates without explicitly stated parameters. The harvest rate employed in this fishery would also become more of an issue if the catch approximated the TAC level. In dealing with this uncertainty in the context of managing risk, the Council notes that as the harvest (and risk) increases, there will be a greater need for caution.

**3. On an interim basis pending the development**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Catch | 6 | 6.7 | 6.2 | 3.9 | 3.3 | 2.4 | 1.9 | 2.5 | 4.8 | 5.1 | 4.8 | 4.7 | 6.2 | 5.38 | 4.68 |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

**of a longer term management strategy as recommended last year, the FRCC recommends continuation of the TAC for Unit 3 Redfish in 2000/2001 at 9,000t.**

A new factor this year is a result from studies indicating that redfish in the Gulf of Maine are genetically distinct from redfish in the rest of Unit 3. These results are potentially very significant in future management of the stocks in both areas, particularly given the existing flexibility of the fleets to capture available quotas substantially in one area or the other. It is extremely important that follow up work be completed in an expeditious fashion.

**4. The FRCC recommends that DFO Science Branch bring together scientists, industry, and managers to identify and prioritize work that needs to be undertaken as follow-up to the results of the Redfish Multidisciplinary Research Program. This initiative should be undertaken, and sufficient human and financial resources should be brought to bear, with the objective of incorporating results into future management of the various stocks as soon as possible.**

Regardless of the action taken as a result of the aforementioned follow-up initiative, it is important that interested parties continue to monitor any potential shifts in effort and catches of redfish to ascertain whether ranges of available redfish concentrations (and those of other stocks in the area) may be contracting.

**5. The FRCC requests DFO to monitor and report on catch rates and catch length frequencies for each of the main redfish fishing areas within Unit 3 over the next 12 months.**

## HISTORY OF FRCC RECOMMENDATIONS

The Council recommended that the **1994** TAC for Unit 3 redfish be set at 10,000t. For **1995**, the Council recommended the TAC of 10,000t and also that the incidence of small fish be monitored and the area be closed to fishing when the incidence of small fish has reached an appropriate predefined level. The Council reiterated that there was a need for maintaining for **1996** the same small fish closure provisions as recommended in 1994, with a 1996 TAC of 10,000t. For **1997**, the Council recommended that the TAC for Unit 3 redfish remain at 10,000t. The Council also recommended that the small fish protocol be consistently applied and enforced, and other measures to avoid small fish should be evaluated, including increased mesh size. For **1998**, the FRCC repeated its recommendations that the TAC for this stock be set at 10,000t, and that small fish protocol should be consistently applied and rigidly enforced. The Council also recommended that the closed area known as the Bowtie should be redefined to optimize protection of small fish, and that DFO Science should seek to determine more precisely the sustainable catch level for this stock. For **1999**, it was recommended that the TAC be reduced to 9,000t as an extra caution in the management of this resource as well as a series of information gathering and enforcement initiatives.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Condition: | apparently stable |
| | *Compared to average* |
| Spawning Biomass: | uncertain but apparently stable |
| Total Biomass: | uncertain but apparently stable |
| Recruitment: | moderate; less intermittent than other redfish stocks |
| Growth and Condition: | good; typical for this stock |
| Age Structure: | stable |
| Distribution: | harvest has shifted more towards the Gulf of Maine in recent years |
| Recent Exploitation: | uncertain * |

*while DFO refers to the underestimation of the total biomass and to the probability that exploitation remains below F0.1, the Council notes that recent catches have approximated ½ of the available TAC and also makes note of the opinion that redfish stocks feature recruitment and growth characteristics that are substantially different from other species, and therefore that they may not be managed to best advantage under the yield-per-recruit model based on the F0.1 level of exploitation. It is expected that the development of a longer term management strategy will explicitly set a reasonable target harvest rate for this stock.

# REDFISH - 3O

## 1999 CONSULTATIONS

Public consultations were held in various communities in November and December 1999. An Atlantic-wide consultation was held in Halifax on December 2, 1999. The redfish industry participants at this meeting were of the general view that the status of the stock in 3O was similar to the previous year. Some participants asserted that the prevalence of small fish in the catch (<22 cm) continued to be a problem, and queried whether management measures should be changed for this fishery. Other participants asserted that problems with high proportions of small redfish in the catch had improved during the 1999 fishery, due in part to the influence of a small fish monitoring/reporting program, and in part to the growth of the dominant year class that was available to the fishery. It is generally acknowledged that reduced catches in 1999 are a result of reduced demand for the smaller-sized redfish normally associated with this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 DFO Stock Status Report indicates that:

- The Spring and Fall research vessel surveys suggest the survey biomass remains stable at approximately 100,000t.
- There is concern that there has been little sign in recent surveys of size groups smaller than 17cm.
- It is still not possible to describe overall trends in total stock size or to estimate the current size of the fishable portion of the population, nor is it possible to determine current fishing mortality rate.
- Catches at the 10,000t level are not likely to exceed $F_{0.1}$.

The Council notes that biomass estimates of this stock are uncertain due to the nature of the bottom in this management unit and the apparent distribution of fish by size in relation to this. The Council also notes that the most appropriate long term exploitation strategy for this stock needs to be considered within the context of the pattern of recruitment for redfish stocks and the capabilities of science and industry to monitor and quantify changes in stock size and characteristics. Finally, it is noted that recent genetic studies serve to dispel speculation that there is a relationship between the presence of predominately small redfish in this area and the stocks of other areas. It is important that the results of these studies be confirmed.

Reflecting on the advice of the scientists, and observing that an annual catch in the range of 10,000t remains well within the longer term average for this stock, it is concluded that there is no basis to adjust the current approach to fishing mortality. Having noted this, the Council observes that unregulated catches of vessels outside Canada's 200 mile zone have been increasing in recent years, increasing from about 3,000t in the years 1995-97 to 7,000t in 1999. If this trend continues, and if the Canadian fleet catches its available quota, this stock will be vulnerable to overexploitation.

**1. The FRCC recommends that the TAC for 2000/2001 for 3O redfish be set at 10,000t.**

**2. The FRCC recommends that DFO develop options to bring fishing effort on 3O Redfish under control in the NAFO Regulated Area.**

The Council recognizes the recent implementation of the small fish monitoring and reporting system to address the well documented pattern of landing small redfish from this management unit, and feels that this initiative must be continued in future years.

**3. The FRCC recommends that the small fish protocols be applied to all fleets harvesting the resource throughout the range of the stock, and be rigorously enforced.**

**4. The FRCC reiterates its previous request that DFO Science Branch investigate and provide advice regarding potential small fish closure areas for implementation in the 2001/2002 fishery.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 20 | 20 | 20 | 14 | 14 | 14 | 14 | 14 | 14 | 10 | 10 | 10 | 10 | 10 | 10 |
| Catch | 12.9 | 11.1 | 13.2 | 11.2 | 11 | 9 | 7.6 | 20.6 | 13.1 | 4.4 | 2.8 | 9 | 4.7 | 7.06 | 2.26 |

*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council recommended reduction of the TAC to 10,000t for **1994**. In November 1994, the Council expressed its concern over the uncertainties related to the origin and abundance of small redfish in this Division. The Council recommended that the **1995** TAC be set at 10,000t, that a small fish protocol be established to protect juvenile redfish and that research be accelerated to determine the origin of the small fish found in this Division. The Council recommended a **1996** TAC at 10,000t and continuation of small fish protocols.

For **1997**, Council recommended a TAC of 10,000 and further recommended that small fish protocols remain in place and apply to all fleets harvesting the resource throughout the range of the stock. The FRCC also indicated that modifications to gear should be examined to reduce the catch of small fish while minimizing post selection mortality.

For **1998**, the Council recommended that the TAC for 3O redfish be maintained at 10,000t, that further scientific effort be applied to determine sustainable levels of harvesting for this stock; and that small fish protocols remain in place. The Council also recommended that a DFO-industry workshop be established to address the issues associated with the capture of juvenile redfish, including the definition of closed or restrictive areas, with results of this workshop to be included as part of the CHP for all fleets in this fishery for 1998. The **1999** TAC was recommended to be 10,000t. Continuation of the special dockside size monitoring program was also recommended. Finally, DFO Science Branch was requested to investigate and provide advice regarding potential small fish closure areas for potential implementation in the year 2000.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Condition: | stable |
| | *Compared to average* |
| Spawning Biomass: | uncertain |
| Total Biomass: | apparently stable |
| Recruitment: | apparently declining |
| Growth and Condition: | good; typical for this stock |
| Age Structure: | uncertain |
| Distribution: | unchanged |
| Recent Exploitation: | uncertain |

# ENVIRONMENTAL OVERVIEW FOR SUB-AREAS 0, 2 +3

The 1999 Newfoundland Region Groundfish Overview provides a summary of the environmental conditions for the area. The following is drawn in part from the Overview.

Annual air temperatures over most of the northwest Atlantic increased during 1998 over 1997 values. Values in 1997 were cooler compared to 1996. Sea ice on the Newfoundland and Labrador Shelves generally arrived later and left early resulting in a shorter duration and a decrease in the areal extent during 1998 over 1997 values. The 1997 coverage was also greater than in 1996. The number of icebergs reaching the Grand Banks in 1998 was higher than in 1997 but still much lower than during the early 1990s.

At Station #27 off St. John's, 1998 temperatures over all depths were 0.3° to 0.5°C above normal over most of the water column during winter months. Temperatures fell below normal by up to 2°C at 30m by mid-Summer. These colder than normal temperatures penetrated deeper into the water column reaching 100m depths by November.

Bottom temperatures on the Grand Bank during the Spring of 1998 were up to 1°C above the long-term average with a very small area of sub-zero °C water restricted to the deeper portions of the Avalon Channel.

Off the south coast, the relatively cold conditions which began around the mid-1980s have moderated somewhat, even though below normal bottom temperatures continued through 1996. There was cooling again in 1997 although temperatures warmed to near normal late in the year in inshore areas. During April of 1998, bottom temperatures were about average over Burgeo Bank and Hermitage Channel, and appear to have moderated to near normal values over most of St. Pierre Bank: these represent an increase over 1997. Temperatures during 1999 continued to warm, and were above normal over most of the water column and near the bottom. The subzero bottom water which had shown a dramatic increase since the mid-1980s, decreased in 1998, and disappeared in 1999. It appears that the cold trend on St. Pierre Bank which had been evident moderated in 1998 and again in 1999.

# HADDOCK - 3LNO

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 Newfoundland Region Groundfish Overview indicates that:

- The 1998 year class may be strong.
- Most catch is taken in 3O.

Haddock abundance in 3LNO was low throughout the 1970s, higher in 1984-1988, and subsequently low. Very few haddock have been found in recent research vessel surveys. The research surveys show that recent year classes are weak and there are few prospects of the stock improving in the near future. Fish that reach spawning age must be protected if recruitment is to improve in the future for this stock.

**1. The FRCC recommends that there be no directed fishing for 3LNO haddock in 2000/2001 and by-catch protocols be applied when prosecuting other fisheries.**

Information from 1998 and 1999 surveys suggest the possibility of a good 1998 year class. Given that this used to be a major fishery up until the 1960s, the Council believes that measures must be adopted to protect this year class. It is believed that the current NAFO moratorium on various stocks in this area, as well as restrictions on the 3LNO yellowtail fishery, will assist in the protection of this year class. However, the Council strongly believes that work should be undertaken to determine whether there is any particular area that could be considered as a nursery area.

**2. The FRCC recommends that DFO Science undertake the necessary work immediately to determine if any areas in 3LNO could be considered as nursery areas for haddock.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council noted that the TAC had been reduced to 500t for 1993, from 4,100t in 1992, following recommendations from scientists that removals be limited to a by-catch fishery with a precautionary ceiling of no more than 500t. In order to prevent a repeat of the heavy exploitation that was exerted in the mid-1980s on the 1980 and 1981 year classes, the Council recommended that there be no directed fishing for the 3LNO haddock stock in 1994 and that by-catches be limited to 500t. In November 1994, the Council reiterated its advice for no directed fishery and recommended reducing the by-catch limit to 100t for 1995. The Council noted in 1995 that there had been no signs of improved recruitment and there were no prospects for stock improvement in the near future. It again recommended no directed fishing in either 1996 or 1997 and a by-catch limit of 100t each year.

For 1998, the Council recommended continuation of the prohibition on directed fishing and that by-catch protocols be applied when prosecuting other fisheries. This recommendation was repeated in 1999, with an additional recommendation to begin to identify haddock nursery areas.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | -- | -- | 4.1 | 8.1 | 8.1 | 10 | 4.1 | 4.1 | by-catch | | | | | | |
| Catch | 4 | 7.8 | 5.7 | 8.1 | 6.1 | 3.1 | 1.1 | 0.9 | 0.8 | 0.01 | 0.02 | 0.09 | 0.33 | 0.91 | 0.05 |

*Catch as of Nov 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | low |
| | *Compared to average* |
| Spawning biomass: | low |
| Total Biomass: | low |
| Recruitment: | production of young haddock has been poor since 1980-81 but indications from the 1998-1999 surveys suggest a possible improvement |
| Growth and Condition: | not available |
| Age Structure: | 1998 year class may be strong |
| Distribution: | concentrated in 30 |
| Recent Exploitation Level: | unknown; fishing pressure likely reduced due to moratoria on cod and flatfish, and to reduced by-catch limits |

# REDFISH - 2+3K

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 Newfoundland Region Groundfish Overview indicates that:

- Recruitment has been poor since the year classes of the early 1980s.
- A pulse of recruitment (age 3) has been detected in recent surveys.
- This stock remains at a very low level.
- There are no indications that the status of the stock will change in a positive way in the foreseeable future.

There are no indications of good recruitment, although there are early indications of a strong 3 year old class. Recruitment into this stock, when it occurs, would require a minimum of 10 years before it would contribute to any fishery. No fishing on this stock is justified.

**1. The FRCC recommends that there be no directed fishing in 2000/2001 of 2+3K redfish and that by-catch protocols be applied when prosecuting other fisheries.**

**2. The FRCC recommends that DFO Science investigate why significant recruitment to this stock has not been observed over the last several decades.**

## HISTORY OF FRCC RECOMMENDATIONS

In 1993, the Council observed that, given the very low level of this stock, the TAC of 20,000t was too high and recommended, as a precautionary measure, that the 1994 TAC for the 2+3K redfish stock be set at 1,000t. There was practically no fishing during 1994. In November 1994, the Council recommended that any directed fishery, should it be allowed, be carried out within the framework of a scientifically coordinated test fishery and that a nominal amount of 200t be provided for that purpose in 1995. This advice was repeated for 1996.

In October 1996, the Council recommended that there be no directed fishing in 1997 on 2+3K redfish. The same recommendation was made for 1998 with the additional recommendation that by-catch protocols be applied when prosecuting other fisheries. This recommendation was repeated for 1999 with the addition of a recommendation to investigate recruitment failures in this stock. The Council recognizes that a workshop on stock recruitment will be held by DFO in 2000, and looks forward to its outcome.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 35 | 35 | 35 | 35 | 35 | 35 | 20 | 20 | 20 | 1 | 0.2 | 0.2 | by-catch | | |
| Catch | 31.5 | 30.3 | 20.8 | 6.9 | 3.3 | 2.4 | 2.6 | 0.02 | 0.05 | 0.01 | 0 | 0 | 0 | 0 | 0 |

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | extremely low |
| | *Compared to average* |
| Spawning biomass: | very low |
| Total Biomass: | very low; less than 10% of 1978-88 average |
| Recruitment: | very poor |
| Growth and Condition: | not available |
| Age Structure: | poor; some positive sign of age 3 fish |
| Distribution: | |
| Recent Exploitation Level: | low |

# American Plaice - 2+3K

## 1999 Consultations

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. The stakeholders in Gander noted that this stock had been the subject of a significant fishery in the past, and that an experimental quota would permit a directed fishery to gather data on this stock.

## Analysis & Recommendations

The 1999 Newfoundland Region Groundfish Overview indicates that:

- Biomass index in 2J3K declined by over 96% between 1982-83 and 1992-94.
- Reported catches are less than 25t for the last 4 years.
- In recent years recruitment has been low.
- Continues to be no optimism about recovery.

Research vessel surveys continue to show that the stock is at a very low level. In Divisions 2J3K, the biomass index is 10-15% of the peak values seen in 1982 – 83.

**1. The FRCC recommends that there be no directed fishing for 2+3K American plaice during 1999 and that by-catch protocols be applied when prosecuting other fisheries.**

**2. The FRCC recommends that co-operative science-industry surveys be developed to increase the data base for this species.**

**3. The FRCC recommends that DFO Science begin work to determine stock definition, as some stakeholders believe there may be separate stocks in Bays such as St. Mary's and Trepassey.**

## History of FRCC Recommendations

In November 1993, the Council noted that the spawning biomass was far below any previous level and that there were no signs of good recruitment for this stock. The Council recommended that there be no directed fishing for 2+3K American plaice in 1994 and that by-catches be limited to 500t. The Council re-iterated its recommendation in November 1994 for no directed fishing, together with a reduction in the by-catch limit to 100t. This advice was repeated for 1996.

With no new scientific data available, and no evidence of a change in status of this stock, the advice of previous years - no directed fishing and a by-catch TAC of 100t - was reiterated for 1997. It was also recommended that cooperative science-industry surveys be encouraged in an attempt to increase the data base on the current and ongoing status of this stock. The recommendation for 1998 was that there be no directed fishery and that by-catch protocols be applied when prosecuting other fisheries. For 1999, the Council additionally recommended that a co-operative industry/science survey be developed and that stock definition work be undertaken. Other than catch restrictions, these recommendations were not accepted.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | | | by-catch | | | |
| Catch | 0.8 | 3 | 1 | 0.9 | 4.1 | 1.8 | 0.5 | 0.07 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 |

*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low |
| | *Compared to average* |
| Spawning biomass: | very low |
| Total Biomass: | very low; recent estimates only 10-15% of early 1980s |
| Recruitment: | poor |
| Growth and Condition: | not available |
| Age Structure: | gradual reduction in number of older fish; all age groups depressed |
| Distribution: | moved to deeper water in late 1980s |
| Recent Exploitation Level: | low; by-catch only |

# WITCH FLOUNDER - 2J3KL

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville in November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 Report of the NAFO Scientific Council indicates that:

- This stock remains at a very low level.
- There are some indications of movement to deeper waters of 3L.
- The Scientific Council does not anticipate any marked improvement in the fishable part of the population over the next several years.

Witch is a slow-growing species that may live to 30 years. Age groups in the 2J3KL stock have been reduced substantially since the 1970s. There are fewer older fish now. Fishing has generally taken fish from pre-spawning and spawning concentrations. Recently, witch appears to have moved to deeper water (in excess of 900 m). Recent data on this stock indicate that it has dramatically declined since the 1980s; relative biomass in 1994 was estimated to be 4% of the 1986 level. Research surveys in 1996 found that witch was somewhat more abundant in the Flemish Pass area which could make it vulnerable to by-catch in the turbot fishery ouside 200 miles and may have migrated from Canadian waters. Generally, the stock is at the lowest level ever observed and there are no signs of improving recruitment. The shrinking area of distribution of this stock, despite its low biomass, may increase its vulnerability to fishing.

**1. The FRCC recommends that there be no directed fishing for 2J3KL witch flounder in 2000/2001 and that by-catch protocols be applied when prosecuting other fisheries.**

## HISTORY OF FRCC RECOMMENDATIONS

In 1993, the Council noted that the biomass of witch flounder in 2J3KL was far below any previous estimate in the 15-year time series, and consequently recommended that, as a precautionary measure, the 1994 TAC for 2J3KL witch flounder be reduced to 1,000t. In November 1994, the Council recommended that there be no directed fishing for 2J3KL witch flounder in 1995 and that by-catches be limited to 100t in 1996. The Council repeated this recommendation for 1997.

In October 1996, the Council recommended that there be no directed fishing for 2J3KL Witch flounder in 1997 and that by-catches be limited to 100t. The Council also recommended that cooperative science-industry surveys should be encouraged.

For 1998, the Council repeated its recommendation regarding cooperative science – industry surveys, and for 1998 and 1999 recommended that there be no directed fishery and that by-catch protocols be applied when prosecuting other fisheries.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 8 | 8 | 6 | 5 | 5 | 4 | 4 | 4 | 4 | 1 | by-catch | | | | |
| Catch | 3 | 3.9 | 4.5 | 3.9 | 4.9 | 3.9 | 4 | 2.6 | 0.4 | 0.6 | 1.3 | 1.7 | 1.2 | 0 | 0 |

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | extremely low |
| | *Compared to average* |
| Spawning biomass: | very low |
| Total Biomass: | very low |
| Recruitment: | poor; no signs of improvement |
| Growth and Condition: | not available |
| Age Structure: | not available |
| Distribution: | shrinking; may have migrated to deeper waters in early 1990s |
| Recent Exploitation Level: | appears low but if stock has migrated to deeper waters outside the Canadian zone, could be vulnerable to unregulated fishing |

# GREENLAND HALIBUT - 0B+1B-F

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. Comments on the stock were made in both Gander and Clarenville to the effect that while the stock is continuous throughout 0, 1, 2+3, and the TAC is increasing in 2+3 commensurate with a biomass increase, this increase in biomass has not led to an increase in the TAC in 0+1. Support was also expressed for an expansion of the longline fishery for this stock.

## ANALYSIS & RECOMMENDATIONS

Catches peaked at 18,000t in 1992 but have been stable around 10,500t since then. Catch rates have been stable in recent years. Recruitment estimates at age 1 of the 1992 – 94 year classes were lower than the presumably good 1991 year class, but are still considered to be at or above average for the last decade. The 1995 year class was estimated to be the best in the time series. The 1996 and 1999 year classes were estimated to be below the average of the last decade. The age composition in the catches has been stable in recent years. The decline in the stock observed until 1994 seems to have stopped and the stock seems to be back at the level of the late 1980s and early 1990s. The NAFO Scientific Council recommends that the TAC for 1999 should not exceed the current level of 11,000t in sub-area 0 + Division 1A (offshore) +1BCDEF.

The Greenland halibut stock in sub-areas 0 and 1 is part of a biological stock complex which includes sub-areas 2 and 3. Scientific efforts in sub-areas 2 and 3 include abundance and biomass surveys by Canada (1978-1998), European Union (1988-1998) and EU-Spain (1995-1999). In sub-area 0 there has been no similar research by Canada since 1986. A survey was carried out by Canada in division 0A in 1999 with funds provided by the Nunavut Wildlife Management Board and DFO and undertaken using a boat from Greenland. A similar effort is planned for division OB in 2000.

Since the main spawning grounds for this stock is in the Davis Strait (sub-areas 0+1) the Council is very concerned about the lack of appropriate research of this important component of the 0+1+2+3 stock. This is especially important in light of the recent TAC increase in sub-areas 2+3 (from 27,000t in 1998 to 35,000t for 2000), as set by NAFO.

This is the largest groundfish stock in the northwest Atlantic at the present time. Since the southern portion (2+3) of the stock has an increasing TAC and since the 0B+1B-F TAC of 11,000t is near fully subscribed each year, it is obvious that additional scientific research is needed in sub-area 0 as was noted in our October 1998 report.

**1. The FRCC recommends that a full multi-year scientific program in sub-area 0 be implemented in 2000.**

**2. The FRCC recommends that the 2000/2001 TAC for Greenland halibut in 0B+1B-F be set at 11,000t.**

**3. The FRCC recommends that Canada and Greenland seek consistency in controls on harvesting Greenland halibut in sub-area 0B+1B-F.**

**4. The FRCC recommends that closed spawning areas and closed nursery areas be implemented in the Davis Strait in 1999.**

**5. The FRCC recommends that as by-catch of juvenile halibut in the Greenland shrimp fishery may become a problem for the stock, Canada pursue with Greenland the implementation of proper conservation measures (e.g., Nordmore grate become mandatory).**

**6. The FRCC continues to be concerned about the conduct of this fishery, especially with respect to the possible loss of gillnets, soak time, and the waste associated with ghost fishing and extended soak times.**

**7. The FRCC recommends that fishing plans for 2000/2001 be such that, net limits reflect the**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 11 | 11 | 11 | 11 | 11 | 11 |
| Catch | 1 | 0.3 | 1.3 | 2.6 | 2.2 | 15.6 | 11.4 | 14.5 | 11.9 | 10 | 11 | 10 | 11 | 11 | |

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

**number that can be handled in a period of time that will minimize waste due to quality deterioration, and measures continue to be implemented to reduce net loss and the associated ghost fishing.**

**8. The FRCC recommends that observers continue to be deployed in this fishery to gather information on soak times, discard levels, adherence to net limits, net loss and any other information that will assist in decision making related to the conservation of this stock.**

**9. The FRCC recommends that otter trawlers pursuing this fishery be required to use a minimum of 145mm diamond mesh until the results of the joint industry – DFO studies are available on the optimal mesh size and configuration to protect juveniles.**

**10. The FRCC recommends that alternatives to gill-netting, such as long lining be explored for this stock.**

## HISTORY OF FRCC RECOMMENDATIONS

In its first reports (November 1993 and June 1994) on Greenland halibut, the Council recommended that the TAC for sub-areas 0+1 be set at 25,000t (12,500t for Sub-area 0). Further work of the NAFO Scientific Council in June 1994 led to the recommendation that the 1995 TAC be set below 11,000t for Divisions 0B and 1B-F, i.e., below the offshore catch levels (11,000-15,000t) seen in recent years.

In November 1994, the Council recommended that the 1995 TAC be set below 11,000t and recommended that the conservation merits and feasibility of closing a spawning area in Davis Strait be evaluated in bilateral discussions with Greenland on appropriate sharing arrangements. The 1995 Canadian quota for sub-area 0 was set at 5,500t.

For 1996, the Council repeated its recommendations for a TAC below 11,000t and the feasibility of closing a spawning area in the Davis Strait. Again in 1997 and 1998, the Council recommended that Canada and Greenland seek consistency in controls on harvesting and that the feasibility of closing spawning and nursery areas be explored with Greenland. In addition the FRCC expressed concern about the emerging fishery by gillnets in this area and concern about potential for juvenile Greenland halibut by-catch in the shrimp fishery in this area.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | stable |
| | *Compared to average* |
| Spawning biomass: | unknown |
| Total Biomass: | lower than in late 1980s and early 1990s |
| Recruitment: | strong 1991 year class; 1992-94 year classes average; estimates of 1995 year class variable; 1996 year class relatively low |
| Growth and Condition: | unknown |
| Age Structure: | age composition stable in catches in recent years |
| Distribution: | normal |
| Recent Exploitation Level: | unknown |

# ROUNDNOSE GRENADIER - SUB-AREA 0

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATION

The 1999 NAFO Scientific Council Report notes that the stock found in the Davis Strait is probably connected to the other stocks in the North Atlantic. The stock component found in sub area 0 +1 is at the margin of the distribution area. Previous Canadian and Russian surveys showed that most of the biomass generally was found in sub area 1. The exploitation level is considered to be low in recent years and the stock seems to be at very low levels. The Scientific Council recommends that there be no directed fishing.

**1. The FRCC recommends that there be no directed fishing for roundnose grenadier in sub area 0 in 2000/2001.**

## HISTORY OF FRCC RECOMMENDATIONS

In its 1993 and 1994 reports, the Council recommended the TAC for Sub-area 0 roundnose grenadier be set at 3,000t. In its 1995 report, Council recommended that should there be directed fishing on this stock, it be done in the context of a scientifically conducted test fishery. In Building the Bridge, Council's November 1996 report, it was recommended that there be no directed fishery on this stock and cooperative industry-science surveys should be encouraged. For 1998 and 1999, the Council continued its recommendation for no directed fishing.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 |  | Moratorium |  |  |
| Catch | 0.2 | 0.008 | 0.01 | 0.5 | 0.08 | 0.29 | 0.19 | 0.11 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 |

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

|  |  |
|---|---|
| Overall stock Indicator: | very low |
|  | *Compared to average* |
| Spawning biomass: | likely low (unspecified) |
| Total Biomass: | very low |
| Recruitment: | not available |
| Growth and Condition: | not available |
| Age Structure: | not available |
| Distribution: | unknown |
| Recent Exploitation Level: | low |

# ROUNDNOSE GRENADIER - 2+3

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATION

The 1999 report of the NAFO Scientific Council notes that due to limited data it is not possible to determine the state of the stock. Reported catches for each of 1997 and 1998 are 50t, taken as by-catch. The Scientific Council notes that it is not possible to provide any advice for 2000.

**1. The FRCC recommends that there be no directed fishing for roundnose grenadier in 2+3 in 2000/2001.**

## HISTORY OF FRCC RECOMMENDATIONS

In earlier reports, released in the fall of 1993, and 1994, the Council recommended that the TAC for roundnose grenadier be set at 4,000t in 1994 and again for 1995. The TAC was set at 500t for 1995. For 1996 and 1997, the FRCC recommended there be no directed fishing on roundnose grenadier in Sub Area 2+3 and that cooperative industry science surveys would assist in furthering the knowledge on this stock. For 1998 and 1999, the Council continued its recommendation that there be no directed fishery.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 3 | 3 | 1 | Moratorium | | |
| Catch | 4.9 | 7.4 | 8.3 | 6.3 | 4.9 | 3.9 | 5 | 7 | 4.4 | 4 | 4 | 4.2 | 3.5 | 0.11 | 0.14 |

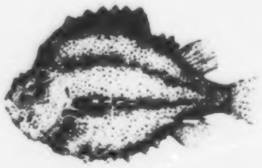
*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | unknown |
| | *Compared to average* |
| Spawning Biomass: | unknown |
| Total Biomass: | unknown |
| Recruitment: | unknown |
| Growth and Condition: | unknown |
| Age Structure: | unknown |
| Distribution: | unknown |
| Recent Exploitation Level: | unknown |

# LUMPFISH



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. In Deer Lake, fishermen reported 'good' landings of lump. In Gander, fishermen reported an increase in effort in 1999, while in Clarenville, fishermen reported an increase in landings despite a decrease in effort.

## ANALYSIS & RECOMMENDATIONS

The 1999 Newfoundland Region Groundfish Overview indicates that:

- There are no scientific investigations to determine the current status of this stock.
- Landings in 1998 were 1,100t, down from 2,000t in 1997.
- Surveys are not useful in evaluating this resource due to relative inshore distribution of the stock compared to survey coverage.

Lumpfish males establish breeding territories inshore; these may be used year after year. Data from studies which have monitored these territories indicate exceptional impact from the fishery. The lumpfish fishery is exclusively on pre-spawning mature females and therefore the spawning stock is vulnerable to over exploitation. Since the cod moratorium, there has been an increase in fishers entering this fishery. Research vessel surveys are not considered to be representative of the stock due to the seasonal migratory pattern of this species. There is insufficient new data to determine the status of this resource. The Council cannot emphasize too much its concern over this stock. A continuing fishery that targets only mature spawning females is a recipe for disaster.

**1. The FRCC recommends that measures taken to control effort in the past few years should be continued.**

The Council also notes that the inshore nature of this stock lends itself to more local community-based research.

**2. The FRCC recommends that fishers and managers assess their local stocks and implement appropriate conservation measures in agreement with the local stock status, e.g., full closures, rotating local closures, shortening seasons, effort reductions, and the Department provide the Council with the fishery status by these local areas at the end of the season.**

**3. The FRCC recommends that fishers and science must continue to gather more information on this stock through the establishment of an Index Fishermen Program especially with respect to: catch and effort levels, spawning patterns, growth rates, maturation, population structure, temperature preferences and habitat preferences. Further recommendations for continuation of this fishery is incumbent upon information of this nature being provided to the council.**

## HISTORY OF FRCC RECOMMENDATIONS

The FRCC first reported on this particular stock in 1995. The Council recommended that management measures, such as shortened season, be used to reduce the effort on this stock. It further recommended that roe content monitoring programs, similar to those employed in the capelin fishery, be established to ensure that fishing takes place at an appropriate time and that closed and protected areas be established for this stock.

In October 1996, the Council recommended that dramatic new management measures be taken to insure conservation of lumpfish in 1997 and that these measures include a combination of the following:

- Roe content monitoring programs should be established to determine timing of the fishery to maximize yield/fish.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | | | | | |
| Catch | 1 | 1.5 | 4 | 3.3 | 2.3 | 1.2 | 2.1 | 1.9 | 2.4 | 1.5 | 1.2 | 1.5 | 2.26 | 1.1 | |

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

- Closed and protected spawning areas must be established throughout the range of the stock.
- More localized management must be established.
- Effort must be further reduced.
- Gear limits must be decreased and the season shortened.

The Council noted that unless these measures were effectively implemented, the closure of this fishery was imminent. For 1998 and 1999, the Council re-iterated that measures taken to control effort in the past few years be continued and that fishers and Science gather more specific information on this stock through an Index Fisherman Program.

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low on North-east coast; stable on South coast |
| | *Compared to average* |
| Spawning biomass: | likely low |
| Total Biomass: | likely low |
| Recruitment: | unknown |
| Growth and Condition: | not available |
| Age Structure: | fishery is exclusively on mature females before spawning |
| Distribution: | seasonal migratory patterns; fishing concentrated on inshore spawning areas |
| Recent Exploitation Level: | fishery regulated by effort; number of participants in fishery increased since cod moratorium; number of nets allowed and duration of fishery have been reduced in recent years |

# COD - 2GH

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville in November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATION

The 1999 DFO Groundfish Overview indicates that:

- There has been no reported catch of 2GH cod since 1991.
- The surveys conducted from 1996-1998 detected very few fish.
- The status remains unknown but abundance is assumed low.

There is limited information on this stock. There are some by-catches reported by observers in the shrimp fishery, although the use of the Nordmore grate is intended to reduce this.

**1. The FRCC recommends that there be no directed fishery on this stock.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council recommended that the 1994 TAC for 2GH cod be set at 1,000t as a precautionary measure. The consultations held in 1994 confirmed that there had been very few cod in 2GH in recent years and led the FRCC to recommend, in November 1994, that any fishery for cod in 2GH be carried out within the framework of a scientifically coordinated test fishery. The Council recommended that a nominal amount of 200t be provided for this purpose. In 1996, 1997 and 1998 the FRCC recommended no directed fishing take place on this stock and cooperative industry science surveys should be encouraged. For 1999, the FRCC recommended no directed fishing on this stock.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 1 | 1 | 0.2 | 0.2 | Moratorium | | |
| Catch | 0.54 | 0.5 | 0.13 | 0.4 | 0.43 | 0.23 | 0 | 0 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall indicator : | very low, status unknown |
| | *Compared to average* |
| Spawning biomass: | unknown |
| Total biomass: | unknown |
| Recruitment: | unknown |
| Growth/Condition: | unknown |
| Age structure: | unknown |
| Distribution: | unknown |
| Recent exploitation: | none - no fishery |

# COD - 3PS

## 1999 FALL CONSULTATIONS

The FRCC conducted public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville, Newfoundland in November 1999. Fishers had mixed views on the rebuilding of this stock. Some thought the stock continued to improve while others were more cautious about the ability of this stock to grow with the current level of harvest. There were strong feelings that the older fish, presumably of the 1989 and 1990 year classes, were being over-harvested and that this would negatively impact future recruitment potential. There were also strong concerns that too much of the fishery was concentrated in Placentia Bay, and there were suggestions that limits to entry or amount of fish harvested in Placentia Bay should be put in place. There were also concerns that coastal stocks were potentially being over-harvested by this concentration of effort. There were views from Industry and the FFAW that stability should be a goal in this fishery, and that the current quota was in line with current stock conservation goals. There was concern about the late opening of the fishery in 1999, but as much concern that spawning stocks be protected.

Views of industry and fishermen were mixed but generally suggested a renewed sense of caution with this stock. **Strong arguments were made for stability in the TAC over time**. There was opinion that the current TAC was sufficiently conservative to sustain the stock. Other views suggested to achieve stability a TAC reduction was appropriate.

## ANALYSIS & RECOMMENDATIONS

The paramount FRCC objective for this stock is the rebuilding of a spawning stock biomass composed of a wide range of ages, particularly of older fish, across all spawning components of this stock. It is therefore important to select conservation measures and TAC that enhance the probability that the spawning biomass will continue to increase and broaden in age structure among all stock components.

The spring SSR reported on the state of the 3Ps cod stock and indicated a total 3+ biomass near 250,000t and spawning biomass at very high levels relative to those of the past few decades (approximately 150,000t). The predominant view of industry was that these SSR estimates were conservative, and that the stock was essentially rebuilt beyond historical levels. These SSR and industry views led the FRCC to advise an apparently precautionary TAC of 30,000t for 1999. However, the assessment reported in the current SSR presents a less positive view of stock status (200,000t of age 3+ biomass versus 250,000t) than the spring SSR and suggests that the previous views of scientists, industry and the FRCC were overly optimistic. This change in the perception of stock status mostly results from the inclusion of the April 1999 DFO survey, which suggests a reduction in the size of incoming year classes.

The FRCC subjected the assessment to careful scrutiny. It was noted that of the various assessments prepared at the RAP session, the assessment adopted was among the most optimistic. It was the view of the FRCC that the use of a highly domed partial recruitment curve might lead it to err on the high side of the spawning stock biomass provided by the 1989 year class and older fish. It was also noted that fish older than age 14 were not included in the assessment. By not including the large fish that were once numerous in the population but are now absent, current spawning stock size will appear higher relative to stock sizes of the 1960s and 1970s. Moreover, the current spawning biomass is composed of younger and probably less effective producers of recruitment than was the case historically.

Investigations of the structure of the assessment indicate that there is considerable uncertainty in the results. Uncertainty results from unknown stock structure, the lack of fisheries data during the moratorium, the relatively low levels of removals from fisheries during and after the moratorium, and the conversion from the Engels trawl winter survey to the Campelen

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 41 | 41 | 41 | 41 | 35.4 | 35.4 | 35.4 | 35.4 | 20 | Moratorium | | | 10 | 20 | 30 |
| Catch | 51.4 | 57.9 | 54.3 | 38.6 | 37.8 | 40.7 | 42.4 | 29.6 | 14 | 0.66 | 0.406 | 0.195 | 7.1 | 15.65 | 18.68 |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

trawl spring survey in 1993. Moreover, uncertainty is likely to exceed that presented in the SSR risk assessments as a consequence of uncertainty in model structure and survey inter-calibration. The existence of such uncertainty should not be seen as a criticism of the science but as an inevitable consequence of the current data available with respect to the complexity of this stock. Nevertheless, any prudent interpretation of the assessment must take the large uncertainty into account.

It was the view of the FRCC that the SSR represented an attempt to provide an unbiased view of the stock status and it was for FRCC to add any precaution to its interpretation.

The FRCC also examined preliminary results from the GEAC fall 1999 survey and the 1999 sentinel fishery, and other data and submitted views of industry and fishermen that became available subsequent to the RAP session. These data together suggested a less optimistic view of the stock state than indicated in the current SSR. In particular, there were indications in these data that the older spawning fish of the 1989 and 1990 year class may be fewer than suggested in the SSR.

Given the variable SSR descriptions of stock state and interpretations from other sources (industry and sentinel, acoustic, GEAC surveys), the FRCC believes that it is inappropriate to attempt to satisfy short-term expectations in this fishery by closely tracking the rises and falls of the most current estimates of fishable biomass. It is certain that such estimates are more variable than is the stock. Hence, a precautionary longer-term strategy is recommended that takes into account the range of current assessments and the expected long term productivity of the stock. **The fundamental goal of this strategy is to conserve the spawning stock, including all of its components. In addition, a basic tenet of the longer-term strategy is to provide a higher degree of TAC and management stability to fishermen and industry than possible with past TAC strategies.**

The 1999 fall SSR indicates that:

- Spawning biomass is estimated at 146,500t, similar to that estimated in the March 1999 assessment.
- The biomass of fish aged 3 and older is estimated to be 198,500t, 50,000t lower than the estimate in the March 1999 assessment. This is primarily because strengths of the 1993 to 1999 year classes have been revised down since the March 1999 assessment due to lower numbers of young fish in the April 1999 survey.
- Estimates of recruitment (numbers of fish at age 3) show a general downward trend over the period 1959 to 1999 with all year classes arising after 1989 being particularly low.
- Females continue to mature at relatively young ages: the proportion of 6 year old females that are mature has increased from about 30% in the 1970s and early 1980s to over 80% in recent years.
- There is a greater than 50% risk that spawner biomass will decline further in the year 2000 at catch levels of 25,000t or higher.

**The conservation measures the FRCC has previously set out for this stock (dispersal of catch over space and time; minimize fishing on spawning concentrations; protection of 1989, 1990 year**

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall indicator: | not as strong as previously thought |
| | *Compared to average* |
| Spawning biomass: | among the highest recorded; will decline as older fish are caught |
| Total biomass: | revised down in recent assessment |
| Recruitment: | wearker in recent years |
| Growth and Condition: | stable growth, lower than in the 1970s; good condition |
| Age structure: | no apparent strong year classes since 1989, 1990 |
| Distribution: | more widespread |
| Recent exploitation: | low; rising |

**classes) are not being implemented.** In particular, fishing mortality on the older fish has been excessive, and a concentration of effort and catch in Placentia Bay and on portions of St. Pierre Bank is unacceptable at current levels and may threaten the sustainability of local spawning stocks and fisheries.

The spatial dispersion of the harvest has changed from historical times, especially with the concentration of effort in Placentia Bay during the 1999 fishery. Catches in Placentia Bay traditionally comprised roughly one-third of the catch in 3Ps. A preliminary comparison of spring and fall acoustic surveys in Placentia Bay, GEAC fall surveys, and SSR biomass in the past few years suggests that approximately 1/4-1/2 of the estimated stock biomass has been located in the Placentia Bay region in spring and fall.

The rapid growth in this stock that was evident from 1993 to 1998 and that allowed the reopening of and expansion of this fishery has abated.

The FRCC has received mixed views on recruitment in the 1990s. On the one hand, the SSR suggests that all year classes since 1989 have been poor. On the other, additional research and the views of fishers and industry are not consistent with this view, and suggest that the 1992 year class in particular is relatively strong.

**1. The FRCC recommends that in order to protect local spawning components, effort must be distributed over the whole range of the stock. No more than one-third of the total quota should be taken from Placentia Bay.**

**2. The FRCC recommends that in order to enhance the age structure in the short term, fisheries that target extra large fish should be restricted. In the longer-term, fisheries that target a broad range of sizes, in keeping with their representation in the fishable stock, should be encouraged.**

The timing of the TAC-year and the stock assessment process implemented this year is problematic. The fishery in this stock for the most part takes place in late fall and early winter. The current assessment occurred prior to the main fishery and the GEAC survey. This resulted in the use of year-old sentinel data and limited the number of indices used in the assessment. The use of single or old indices in assessments, especially in the case of a RV index that is known to be highly variable, is not recommended. The FRCC believes that the assessment process and management year be put in tune with the cycles of the fishery, so that the bulk of the fishery has been completed, and all stock indices available are included in the assessment. Hence, the TAC year most logically should begin in the fall. Stock assessments would take place in early summer, allowing adequate time for all current surveys and indices to be prepared for inclusion in the assessment process. This might also apply to other stocks in 3Ps.

**3. The FRCC recommends that stock assessments be conducted in the summer and include all available data and stock indices from the preceding 12 months.**

**4. The FRCC recommends that DFO begin the process to change the TAC year for this stock to begin in the fall and extend to the following end of summer to better reflect the seasonal timing of the fishery as well as the availability of data on this stock: this change should be undertaken for the 2001/2002 year**.

This stock spawns primarily from April to June. Known spawning grounds in Placentia Bay are at the Bar Haven shallows, Oderin Bank, and Cape St. Mary's. This stock also contains components that spawn on St. Pierre Bank and in Fortune Bay. There may also be a late spawning in some years that extends into August.

**5. The FRCC recommends that the fishery be closed at known spawning grounds during April, May and June. These grounds include areas of the Bar Haven banks, Oderin Bank, Cape St. Mary's region, St. Pierre Bank, and any other identified spawning areas.**

The RV trawl survey continues to show high levels of variability. Survey abundance varies widely from year to year (by more than a factor of 10). Age structure interpretations also are very variable. For example, the 1999 spring SSR indicates relatively strong recruitment in several recent year classes, whereas the 1999 fall SSR indicates only weak recruitment since 1989. The confidence in which resultant population trends can be viewed is weakened considerably by such variability.

The FRCC notes that acoustic research surveys conducted during June from 1996 to 1999 suggest that there has been a severe decline in the numbers of older fish of the 1989 and 1990 year classes within the past year. These same surveys suggest that the 1992 year class is relatively strong.

The FRCC has concerns about the conduct of the Sentinel fishery, whose objective was to provide information similar to that which would have been gathered from a commercial fishery during the moratorium, and in the longer term to provide information on distribution, abundance, and other indicators of stock status. **The Sentinel fishery in 3Ps is foundering**, with only 40% of the sentinel activity planned for 1999 completed by late November. This state vastly reduces the usefulness of sentinel data. Evidently, there are problems in operating a Sentinel fishery alongside a commercial fishery. Some of these problems are logistic, in terms of deploying the sentinel effort in a manner consistent with its operation during the moratorium, and some are in terms of data interpretation (for example are catch rates directly comparable between times when an occupied sentinel site is surrounded by other gear and when it was not). A reduction in the amount of sentinel fishing has also taken place, following a significant reduction in the budget of the program.

The FRCC notes that the limited data from the sentinel survey show a decline in catch rates in the fall of 1999, especially of larger fish.

**6. The FRCC recommends that efforts be undertaken to ensure the continued relevance of the information collected in sentinel fisheries.**

The FRCC notes that the 3Ps fishery has changed from a mixed gear fishery with a strong line trawl component to a fishery dominated by gillnets. The use of gillnets may contribute to problems associated with spoiled fish, discarding, and poor quality of landed fish. These conditions have been reported in this fishery and may have resulted in total mortality being higher than reported. While there are several reasons for this situation, the length of time elapsed between tending gillnets is thought to be the primary problem.

**7. The FRCC recommends that all gillnets be returned to port with the vessel, with the result that no gillnets be left untended in the water.**

The FRCC believes that to achieve the stated goals for this stock, management must adapt to current conditions and recent adjustments in the fishery, in particular the switch from traditional longline gear to gillnets, the targeting of older year classes, and the concentration of effort in specific areas. The FRCC has recommendeds a package of conservation measures designed to enhance the age structure and further protect coastal spawning components from over-harvest be implemented. **It is important to note that the package includes all of the above recommendations, as well as a reduction in the TAC to a level thought to enhance the likelihood of stability in the TAC for this fishery in the medium term (3-5 years) and maintain the prospects for longer-term rebuilding.**

**8. The FRCC recommends that the 2000/2001 TAC for 3Ps cod be set at 20,000t.**

## HISTORY OF FRCC RECOMMENDATIONS

In August 1993, the low estimates of biomass for this stock led the Council to recommend that fishing be discontinued, at least until April 30, 1994. The fishery was closed by DFO in September 1993. While the Council indicated in its November 1993 report that recommendations for this stock would be forthcoming following the analysis of the results of the spring survey, such a review was made unnecessary when the fishery was closed by the Minister of Fisheries and Oceans for the whole year.

In November 1994, the Council determined that the results of the 1994 survey confirmed earlier survey results and indicated that the stock abundance was at the lowest level observed since 1978. Consequently, the Council recommended that there be no directed fishing for 3Ps cod in 1995 and that by-catches be kept to the lowest possible level. The Council also recommended that efforts be made to expand surveys into inshore areas, that no recreational/food fishery be permitted and that a broad-based Sentinel Fishery program be implemented.

The Council's recommendations for 1996 were for a continued moratorium on commercial fishing and a significantly expanded Sentinel Fishery with an upset limit of 3,000t to evaluate the high catch rates found by Sentinel fishermen. In 1997 the FRCC recommended a limited commercial fishery with a TAC of 10,000t.

In March 1998, the Council recommended that the TAC for this stock be set at 20,000t, but that measures be taken to disperse the total catch over the fishing year to minimize impacts on stock sub-components. As in 1997, the 1998 recommendations included strict measures for the Conservation Harvesting Plans.

In March 1999, based on the positive outlook in the stock status report on this stock as well as the optimistic views of industry, the FRCC recommended that the TAC be set at 30,000t, and that this TAC was to be dispersed over the full fishing year outside the spawning period. Additional recommendations were made that were intended to enhance the age structure by increasing the survival rate of older fish, to protect 4RS3Pn fish overwintering on Burgeo Bank, and improve the reliability of the trawl survey. The FRCC recognizes the significant efforts being made by the Department of Fisheries and Oceans in response to the Council's recommendations to develop more information on the migration and mixing of stocks, especially in Division 3L and in the northern Gulf of St. Lawrence through tagging efforts.

# AMERICAN PLAICE - 3Ps

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville in November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 DFO Stock Status Report indicates that:

- Since 1992 stock size has been very low.
- Current biomass is only 16% and abundance 21% of the 1983-87 averages.
- Analysis of recruitment from survey data indicated that there were no good year classes between 1980 and 1992.
- There is little prospect of significant rebuilding in the short to medium term.

From the 1999 DFO Stock Status Report the Council notes that catches of 3Ps plaice were highest from 1968-1973 and averaged over 10,000t. Since 1980, catches have exceeded 5,000t only twice and there have been clear indications that the stock has declined dramatically. Research vessel surveys continue to indicate that the stock is at a very low level. All age groups have declined and recruitment in recent years has been very low. The outlook for this stock is very pessimistic.

The SSR indicates that total mortality remained high in 1994 and 1995 following the imposition of the moratorium despite low catches.

**1. The FRCC recommends that there be no directed fishing for 3Ps American plaice in 2000/2001.**

**2. The FRCC recommends catches should not exceed those required for the normal conduct of fisheries directed towards other species.**

**3. The FRCC recommends a co-operative science industry survey should be conducted in this area with the following objectives; to determine the abundance of plaice in the nearshore waters and bays outside the research vessel survey area; to determine whether the plaice that occur shoreward of the research vessel survey area are separate components from the plaice found in offshore areas.**

**4. The FRCC recommends tonnages required for this work are to be determined by DFO science and allocated for this purpose only upon approval of a comprehensive plan. An evaluation of the study is to be conducted upon completion of its year of implementation.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council noted that this stock had declined below any previously-observed level and that there were no signs of good recruitment. The Council recommended that there be no directed fishing and that by-catches be limited to 500t during 1994 The recommended by-catch limit was further reduced in 1995. Closure and minimal by-catch were again recommended for 1996.

With no new scientific data available, and no evidence of a change in status of this stock, the advice of previous years - no directed fishing and a by-catch TAC of 100t - was reiterated for 1997. It was also recommended that cooperative science-industry surveys be encouraged in an attempt to increase the data base on the current and ongoing status of this stock.

For 1998, the Council once again recommended that there be no directed fishing of this stock and that by-catch protocols be applied when prosecuting other fisheries. The Council also recommended the encouragement of co-operative science-industry surveys. For 1999, the Council again recommended that there be no directed fishing of 3Ps American plaice, and again recommended that co-operative science/industry survey work be undertaken. The recommended survey work was not undertaken.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | | | by-catch | | | |
| Catch | 4.2 | 5.1 | 4.9 | 3.5 | 3.9 | 3.9 | 4.2 | 2.6 | 0.3 | 0.1 | 0.09 | 0.56 | 0.17 | 0.13 | 0.52 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | poor |
| | *Compared to average* |
| Spawning Biomass: | very low |
| Total Biomass: | very low |
| Recruitment: | poor |
| Growth and Condition: | not available |
| Age Structure: | all years low recently |
| Distribution: | increases in inshore areas |
| Recent Exploitation: | thought to be low; by-catch only |

# HADDOCK - 3PS

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 Newfoundland Region Groundfish Overview indicates that:

- The index of biomass peaked in 1985 but declined to low levels in subsequent years.
- The 1998 survey results indicate some increase, but biomass was still low compared to the mid to late 1980s.
- In 1999, the biomass index declined.
- The 1999 survey did encounter relatively large numbers of fish that appear to be from the 1998 year class.

**1. The FRCC recommends that there be no directed fishing for 3Ps haddock in 2000/2001.**

**2. The FRCC recommends that catches not exceed those required for the normal conduct of fisheries directed towards other species.**

**3. The FRCC recommends that DFO Science undertake the necessary work immediately to determine if any area in 3Ps could be considered as nursery areas for haddock.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council noted that the TAC had been reduced to 500t for 1993, from 3,200t in 1992. The by-catch of haddock was significantly reduced because of closures in fisheries for other species. The Council recommended that there be no directed fishing for the 3Ps haddock stock in 1994 and that by-catches be limited to 500t. In November 1994, the Council reiterated its advice for no directed fishery and recommended reducing the by-catch limit to 100t during 1995. This advice was repeated for 1996.

In October 1996, the Council recommended that there be no directed fishing for 3Ps haddock in 1997 and that by-catches be limited to 300t and implemented so as not to impede a limited cod fishery.

For 1998, the Council repeated its recommendation that there be no directed fishery of this stock and that by-catch protocols be applied when prosecuting other fisheries. For 1999, the Council again recommended no directed fishing.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | -- | -- | 0.15 | 2.2 | 3.2 | 3.2 | 3.2 | 3.2 | 0.5 | by-catch | | | | | |
| Catch | 7.5 | 5.3 | 2.7 | 2.4 | 2.9 | 1.5 | 0.5 | 0.5 | 0.1 | 0.02 | 0.04 | 0.09 | 0.06 | 0.03 | 0.04 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | low |
| | *Compared to average* |
| Spawning Biomass: | low, unknown |
| Total Biomass: | low, unknown |
| Recruitment: | poor, no signs of improvement |
| Growth and Condition: | not available |
| Age Structure: | not available |
| Distribution: | increased inshore |
| Recent Exploitation: | low, by-catch only |

# POLLOCK - 3PS

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. Many fishermen continue to suggest that pollock appear to be more abundant than the research vessel survey suggests. Fishermen at the Clarenville meeting reported an abundance of good-sized pollock in the inshore, shallow water area, and that pollock by-catches were higher this year. Fishermen were generally optimistic that the warming trend in water temperature might signal an increase in this semi-pelagic, temperature-sensitive fish.

## ANALYSIS & RECOMMENDATIONS

The 1999 DFO Stock Status Report indicates that:

- Historically warmer periods have coincided with higher abundance of pollock in this area.
- Due to the pelagic nature of the species, research vessel surveys (bottom trawl) may not give a reliable index of abundance or biomass.
- In 1999, survey biomass was estimated at 5,700t, largely resultant from two large sets in two strata.

**1. The FRCC recommends that there be no directed fishing for 3Ps pollock in 2000/2001.**

**2. The FRCC recommends catches not exceed those required for the normal conduct of fisheries directed towards other species.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council noted that there were very few pollock in 3Ps and the TAC was reduced from 5,400t to a 600t by-catch limit. The Council recommended that there be no directed fishing for the 3Ps pollock stock in 1994 and that by-catches be limited to 500t. In November 1994, the Council re-iterated its advice for no directed fishing in 1995 and recommended reducing the by-catch limit to 100t. This recommendation was repeated for 1996.

In October 1996, the Council recommended that there be no directed fishing for 3Ps pollock in 1997 and that by-catches be limited to 1,500t, and implemented so as not to impede a limited cod fishery.

For 1998, the Council once again recommended that there be no directed fishing for 3Ps and that by-catch protocols be applied when prosecuting other fisheries. For 1999, these recommendations were essentially repeated.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | -- | -- | 1.5 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | by-catch | | | | | | |
| Catch | 2.3 | 7.1 | 5.0 | 3.9 | 3.4 | 1.7 | 1.1 | 0.5 | 0.06 | 0.09 | 0.15 | 0.13 | 0.6 | 0.01 | 0.46 |

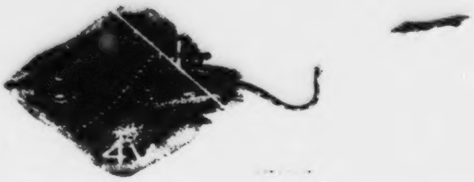
*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | unknown; appears to be increasing |
| | *Compared to average* |
| Spawning Biomass: | unknown; large fish present |
| Total Biomass: | hard to estimate |
| Recruitment: | positive signs inshore |
| Growth and Condition: | growth not available; condition good |
| Age Structure: | variety of sizes observed; unknown |
| Distribution: | sporadic at northern limit of range; may increase with warmer water |
| Recent Exploitation: | low-medium, by-catch |

# SKATES - 3LNOPs



## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville in November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

Of the 8-10 species of skate found in waters around Newfoundland and Labrador, thorny and smooth skates comprise the bulk of catches by commercial fishery and research vessels. Although thorny skates are widely distributed, tagging studies reveal they exhibit limited movement, with re-captured animals found infrequently beyond 100 kms of the site of initial capture.

In comparison to an individual cod which can release millions of eggs a year during a relatively short spawning period, a female skate will lay only 6-40 eggs throughout the year. Special challenges are presented by the limited reproduction potential of this species and insufficient biological information.

The 1999 Newfoundland Groundfish Overview reveals there has been an increase in survey biomass index across the entire stock area from historically low levels in the mid-1980s. Catch and catch rate trends have been declining over this same period. The catch of 1,600t in 1996 marked a low for the Canadian directed fishery but this increased to 12,000t in 1998. The implementation of Council's recommendation for three separate management units for 1997 has begun the process of shifting effort across the entire stock area. Due to the sedentary nature of skates and their tendency to form local aggregations, the DFO 1998 Stock Status Report suggests that management on a level finer than three Divisions may be prudent. The serious deficiency of biological and abundance information on this resource has been emphasized.

**1. The FRCC recommends that 3LN, 30, and 3Ps continue to be treated as separate management areas.**

**2. The FRCC recommends that the overall TAC for the Canadian portion of the zone be set at 3,000t in 2000/2001: this should be distributed between management areas, as recommended in the 1996 Stock Status Report.**

## HISTORY OF FRCC RECOMMENDATIONS

A directed fishery for skates developed on the southern Grand Banks during 1993. Council conducted its first review of this stock in 1995 and recommended a precautionary TAC of 2,000t for 1996 for this new fishery. It was further recommended that steps be taken to distribute effort throughout the management area to prevent heavy exploitation on concentrations. For 1997, Council acted further in its efforts to have the fishery distributed across the entire stock area. Council recommended a 3,000t TAC for 1997 with a provision that it be divided among three separate management units, 3LN, 3O AND 3Ps, as defined in the 1996 stock status report. As well, to supplement information gathering on this resource, cooperative industry science initiatives were encouraged.

For 1998 and 1999, the FRCC recommended that 3LN, 30, and 3Ps continue to be treated as separate management areas; and that the overall TAC be set at 3,000t.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | 6 | 2 | 3 | 3 | 3 |
| Catch | 11.4 | 15.9 | 19.3 | 19.5 | 15.9 | 14.7 | 28.4 | 4.1 | 5.5 | 11.5 | 7.5 | 5.9 | 13.7 | 2.13 | 2.05 |

*Catch as of Nov 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## Council's Views on Stock Status

| | |
|---|---|
| Overall Stock Indicator: | stable at low level |
| | *Compared to average* |
| Spawning Biomass: | unknown |
| Total Biomass: | declined during 1980s and early 1990s recovering |
| Recruitment: | unknown |
| Growth and Condition: | not available |
| Age Structure: | not available |
| Distribution: | local concentrations |
| Recent Exploitation: | increasing |

# WITCH FLOUNDER - 3PS

## 1999 CONSULTATIONS

The FRCC held public consultations on this stock in Deer Lake, Harbour Breton, Gander and Clarenville during November 1999. No stakeholder comments were received on this stock.

## ANALYSIS & RECOMMENDATIONS

The 1999 DFO Stock Status Report indicates that:

- Stock size estimates during the last several years have fluctuated within a range which, on average, is about two-thirds of the average stock size during the late 1980s and early 1990s.
- No indication of increased recruitment.
- Catches at recent levels should not be harmful to the stock.

Quota for witch were first set in the mid-1970s at 3,000t; these were reduced to 1,000t in the late 1980's. Catches come mainly from St. Pierre Bank in depths of 200-900 m. The research survey relative biomass index has shown substantial variation but no trend between 1976-1994. The research survey does not cover Fortune Bay where a large portion of the catch occurs. The 1998 GEAC Survey shows results similar to the DFO survey.

**1. The FRCC recommends that the TAC for 3Ps witch flounder be set at 650t for 2000/2001.**

**2. The FRCC recommends that in order to meet optimum maturity levels for this stock, the mesh size be set in accordance with selectivity studies.**

**3. The FRCC recommends that given there has been no new assessment of this stock since 1996, a joint DFO/industry study be conducted in the inshore areas to assist in the overall assessment process such as appropriate biological sampling, a tagging/movement component, and identification of stock sub-components. The industry survey is to be conducted concurrently with the DFO research vessel survey to ensure that no double counting or "missed fish" occurs due to possible movement into/out of survey areas.**

**4. The FRCC recommends that tonnages required for this work are to be determined by DFO science and allocated for this purpose only upon approval of a comprehensive plan. An evaluation of the study is to be conducted upon completion of its year of implementation. These catches are to be in addition to TAC.**

## HISTORY OF FRCC RECOMMENDATIONS

In November 1993, the Council noted that this stock had been relatively stable and recommended that the TAC level of 1,000t be maintained for 1994. In November 1994, the Council re-iterated its recommendation for the continuation of a TAC level of 1,000t for 1995. Because biomass estimates were historically low the Council recommended that the TAC be reduced to 500t for 1996 and again in 1997. For 1997 the Council recommended that an industry /science survey be encouraged.

For 1998, the Council recommended that the 1998 TAC for 3Ps witch flounder be set at 650t, and to meet optimum maturity levels for this stock, the mesh size be set in accordance with selectivity studies. The Council also recommended that since there had been no new assessment of this stock since 1996, a joint DFO/industry study be conducted in the inshore areas to assist in the overall assessment process such as appropriate biological sampling, a tagging/movement component, and identification of stock sub-components. These recommendations were repeated for 1999.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 0.5 | 0.65 | 0.65 |
| Catch | 0.6 | 1.1 | 1 | 0.30 | 0.87 | 1 | 1.1 | 1 | 0.86 | 0.4 | 0.26 | 0.23 | 0.28 | 0.45 | 0.47 |

*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## Council's Views on Stock Status

| | |
|---|---|
| Overall indicator: | about recent average |
| | *Compared to average* |
| Spawning biomass: | not available |
| Overall biomass: | two-thirds of late 1980s and early 1990s |
| Recruitment: | about long term average |
| Growth and Condition: | not available |
| Age structure: | not available |
| Distribution: | in deep water |
| Recent exploitation: | low |

# LETTER TO THE MINISTER

August 10, 1999

The Honourable Herb Dhaliwal, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister:

Section 4.5 of the Terms of Reference of the Fisheries Resource Conservation Council (FRCC) states:

> *"The Council may also advise the Minister on the position to be taken by Canada with respect to straddling and transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO)."*

Consequently, the FRCC has reviewed the Report of the NAFO Scientific Council with specific reference to matters of particular interest to Canada, and offers advice on Total Allowable Catches for 2000, as well as other conservation measures for NAFO-managed transboundary groundfish stocks, in addition to 2J3KL cod and Greenland halibut in 2&3KLMNO.

In some cases, the NAFO Scientific Council has recommended two-year catch levels for specific stocks. The FRCC has considered this advice, and is of the view that catches for 2001 should be determined in 2000, when more data will be available. The FRCC has therefore limited its acceptance of the NAFO Scientific Council advice to the year 2000 only.

In keeping with recent practice, the FRCC has prepared this report largely on the basis of information contained in the report of the NAFO Scientific Council.

## 1. 2J3KL COD (NORTHERN COD)

The 1999 DFO Stock Status Report indicated stronger coastal components of this stock, with relatively lesser abundance in shelf stock components. This stock has been the subject of recent FRCC advice that recommended a Total Allowable Catch (TAC) be set between 6000 and 9000t to allow for a limited commercial fishery for the coastal portions of 3L and 3K only, as well as a continuation of the sentinel fishery for 2J3KL.

Based on the lack of fish in shelf areas, the FRCC recommends that Canada's position support a continuing moratorium on fishing of 2J3KL cod in Division 3L in the NAFO Regulatory Area.

## 2. GRAND BANKS KEY STOCKS

All NAFO-managed stocks are of importance to Canada. At the present time, the most significant to Canada are:

Yellowtail flounder in Divisions 3LNO
American plaice in Divisions 3LNO
Witch flounder in Divisions 3NO
Cod in Divisions 3NO
Redfish in Divisions 3LN
Greenland halibut in Divisions 2&3KLMNO

The following table shows the TACs and catches (in 000 tonnes) for these stocks since 1980:

| | Year | 80-84 * | 85-89 * | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yellowtail flounder | TAC | 19.6 | 13 | 5 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 4 | 6 |
| 3LNO | Catch | 13.5 | 20.4 | 13.8 | 16.3 | 10.2 | 13.6 | 2.1 | 0.1 | 0.4 | 0.8 | 4.4 | |
| American plaice | TAC | 53.5 | 43.2 | 24.9 | 25.8 | 25.8 | 10.5 | 4.8 | 0 | 0 | 0 | 0 | 0 |
| 3LNO | Catch | 45.6 | 51.6 | 32.5 | 34.7 | 13.4 | 17.1 | 7.4 | 0.6 | 0.9 | 1.4 | 1.6 | |
| Witch flounder | TAC | 5.4 | 5 | 5 | 5 | 5 | 5 | 3 | 0 | 0 | 0 | 0 | 0 |
| 3NO | Catch | 3 | 7.3 | 4.2 | 4.8 | 5 | 4.4 | 1.1 | 0.3 | 0.4 | 0.5 | 0.6 | |
| Cod | TAC | 22.4 | 32.8 | 18.6 | 13.6 | 13.6 | 10.2 | 6 | 0 | 0 | 0 | 0 | 0 |
| 3N0 | Catch | 26.4 | 41.1 | 29 | 29 | 12.6 | 9.7 | 2.7 | 0.2 | 0.2 | 0.4 | 0.6 | |
| Redfish | TAC | 25 | 25 | 25 | 14 | 14 | 14 | 14 | 14 | 11 | 11 | 0 | 0 |
| 3LN | Catch | 19.3 | 45.9 | 29.1 | 25.8 | 27.3 | 21 | 6 | 2 | 0.5 | 0.6 | 1.6 | |
| Greenland halibut | TAC | 55 | 95 | 50 | 50 | 50 | 50 | 25 | 27 | 27 | 27 | 27 | 33 |
| 2&3KLMNO | Catch | 28.9 | 21.6 | 47.5 | 65 | 63.2 | 42-62 | 51 | 15 | 19 | 20 | 20 | |

Note * : TACs and Catches for 1980-1984 and 1985-1989 are five year averages.

This table demonstrates that, with some exceptions, catches have generally exceeded TACs. These excess catches have occurred in the Regulatory Area outside the 200 mile limit and have included large amounts of juvenile fish caught both by member and non-member states.

Canada's shares of the TACs for these stocks are:

| | |
|---|---|
| 3LNO Yellowtail flounder | 97.5% |
| 3LNO American plaice | 98.5% |
| 3NO Witch flounder | 60% |
| 3NO Cod | 47.6% |
| 3LN Redfish | 42.6% |
| Greenland halibut 2+3K | 100% |
| 3LMNO | 15% |

## A. 3LNO YELLOWTAIL FLOUNDER

The NAFO Scientific Council's current view is that the stock size has increased over the past year and that the stock biomass is perceived to be at a level close to that of the mid-1980s.

The FRCC notes that the exploitable biomass for this stock is based upon swept area estimates. These estimates depend upon the assumption that the survey gear catches all fish between the wing ends of the net. In practice, this assumption might lead to under or overestimation of actual biomass. The FRCC therefore considers that DFO should move as soon as possible to establish a better estimate of the biomass of this stock.

The FRCC accepts the NAFO Scientific Council recommendation that the TAC for 3LNO yellowtail flounder be set at 10,000t in 2000.

In addition, the FRCC recommends that:

(a) the NAFO by-catch regime be amended to ensure that bycatches of yellowtail flounder are truly incidental;

(b) measures be undertaken to minimize the bycatch of American plaice and cod in this fishery;

(c) key juvenile nursery grounds be protected through the establishment of closed areas;

(d) a minimum fish size of 30 cm be set for 3LNO Yellowtail flounder;

(e) fishing on peak spawning concentrations be minimized; and,

(f) there continue to be 100% observer coverage in this fishery.

## B. 3LNO AMERICAN PLAICE

The NAFO Scientific Council advises that there have been no strong year classes since the mid-1980s. Even in the absence of a directed fishery since 1995, this stock remains at a low level. Catches have more than doubled since 1995 to 1600t in 1998 despite the moratorium: this increase is mainly due to the catch of plaice in the Greenland halibut and yellowtail flounder fisheries, and in the unregulated skate and grenadier fisheries in the NAFO Regulatory Area. The FRCC has great concern about the continuing increase in exploitation of this resource under moratorium.

The FRCC accepts the NAFO Scientific Council recommendation that there be no directed fishing for American plaice in Divisions 3LNO in 2000.

In addition, the FRCC recommends that:

(a) the NAFO by-catch regime be amended to ensure that bycatches of American plaice are truly incidental;

(b) a minimum fish size of 30 cm be set for 3LNO American plaice;

(c) key juvenile nursery grounds be protected through the establishment of closed areas; and,

(d) there continue to be 100% observer coverage in directed fisheries where American plaice is a bycatch.

## C. 3NO WITCH FLOUNDER

The NAFO Scientific Council advises that the 1998 biomass estimate for witch flounder in 3NO is the lowest observed and there is evidence that stock size may be continuing to decline despite a moratorium since 1995.

The FRCC accepts the NAFO Scientific Council recommendation that there be no directed fishing for 3NO witch flounder in 2000.

In addition, the FRCC recommends that:

(a) the NAFO by-catch regime be amended to ensure that bycatches of witch flounder are truly incidental; and,

(b) a minimum fish size of 30 cm be set for 3NO witch flounder.

## D. 3NO COD

The NAFO Scientific Council advises that biomass levels for this stock are at an all time low and year class strengths in the population are weak. Recruitment has been poor, and once strong 1989 and 1990 year classes are now at low levels.

Recent Canadian juvenile surveys indicate potential signs of stronger recruitment in 1998.

The FRCC accepts the NAFO Scientific Council recommendation that there be no directed fishing for 3NO cod in 2000.

In addition, the FRCC recommends that:

(a) the NAFO by-catch regime be amended to ensure that bycatches of cod are truly incidental;

(b) a minimum fish size of 45 cm be set for 3NO cod; and,

(c) DFO should carefully monitor cod bycatch in the various directed fisheries in 3NO and take effective measures (e.g. area and/or seasonal closures, 100% observer coverage, etc.) to address any emerging problems.

## E. 3LN REDFISH

The NAFO Scientific Council advises that biomass levels in 3L are low and recruitment in this area has been poor since the mid-1980s. There is evidence of good recruitment in the 1986 and 1987 year classes which will form the greatest proportion of the spawning stock biomass, but recruitment since that time has been weak. This stock remains at very low levels.

The FRCC supports the NAFO Scientific Council recommendation that there be no directed fishing for 3LN redfish in 2000.

In addition, the FRCC recommends that:

(a) the NAFO by-catch regime be amended to ensure that bycatches of redfish are truly incidental; and,

(b) every effort be made to protect the 1986 and 1987 year classes.

## F. GREENLAND HALIBUT 2+3KLMNO

The NAFO Scientific Council advises that above average recruitment in the period 1990-1995 has led to improvement in biomass levels in the 2+3KLMNO Greenland halibut stock. While the fishable biomass was below the long term average in 1997, it is expected to increase in 1999 and 2000 as the 1990-1995 year classes recruit to the fishery. Current catches consist mainly of immature fish: allowing these fish to achieve sexual maturity would have an important and positive impact on the spawning stock biomass.

The NAFO Scientific Council advises that a catch in 2000 of 30,000t is likely to allow the stock to continue to increase.

The FRCC does not accept the NAFO Scientific Council recommendation for a catch of 30,000t in 2000.

The FRCC feels that the implementation of measures to protect juvenile fish for this stock are essential and therefore recommends that:

(a) a minimum fish size of 45 cm be set for 2+3KLMNO Greenland halibut;

(b) the bycatch of American plaice, cod and other species be kept at the lowest possible levels;

(c) the bycatch of Greenland halibut in the Canadian and international shrimp fisheries be closely monitored and kept at the lowest possible levels; and,

(d) in light of emerging recruitment in this fishery, measures be taken to implement a sustainable harvest, including:

- 100% observer coverage in the NAFO Regulatory Area; and,
- the development of a plan by the Department in consultation with industry to deal with juvenile catches in the Canadian zone.

The FRCC recommends that any consideration of a TAC level above 27,000t should only be undertaken if these conservation and enforcement measures are implemented.

## CONCLUSIONS:

With the exception of yellowtail flounder and Greenland halibut, estimated biomass levels for the above stocks are at or near the lowest levels ever observed and stock rebuilding potential continues to be uncertain. Measures adopted by the NAFO Fisheries Commission have, for the most part, been ineffective in rebuilding these stocks. With the exception of yellowtail flounder and Greenland halibut, the FRCC recommends that Canada continue to support moratoria on fishing of these stocks, both inside and outside the 200 mile limit.

In addition to the above stocks, the FRCC continues to recommend a moratorium on fishing of 3NO capelin.

Finally, during its deliberations, the FRCC became concerned that while foreign observer reports are made available to the NAFO Scientific Council, they are not compiled and analyzed by the scientists. Scientists do however analyze reports from Canadian observers.

The FRCC recommends that the foreign observer reports be compiled and analyzed.

## 3. EXPLOITATION OF UNREGULATED SPECIES

There continue to be groundfish fisheries taking place in the NAFO Regulatory Area in an unregulated manner, for which no TACs are set. These unregulated fisheries are of concern for two reasons. First, increases in fishing effort on these species pose serious conservation concerns for the species directly. Second, bycatches in directed fisheries such as those for skate and roughhead grenadier pose serious conservation threats to species such as American plaice.

The FRCC reiterates its recommendation that catches of unregulated species not exceed 1994 levels in the NAFO Regulatory Area. In addition, the NAFO Scientific Council should be requested to recommend sustainable harvest levels for these species.

## 4. CONSISTENCY IN CONSERVATION MEASURES

It is the view of the FRCC that conservation measures adopted by the NAFO Fisheries Commission for transboundary stocks should be consistent with those that apply in Canadian waters. NAFO must be urged to implement conservation measures which are already in place in Canadian waters to improve its conservation regime.

The NAFO bycatch regime allows for bycatches of up to 10% by weight of any given quota in directed fisheries. In practice, the industry is able to fish without capturing this large bycatch in most fisheries. Allowing such a large bycatch "quota" thereby encourages the vessels of some contracting parties to fish directly for stocks which are under moratoria. This bycatch regime must be amended to ensure that bycatches are truly the result of incidental catches in directed fisheries, and not the result of underhanded directed fisheries.

The FRCC recommends that the NAFO bycatch regime be amended to ensure that bycatches are truly incidental.

Canada has implemented minimum mesh sizes in its various domestic fisheries in order to ensure the increased protection of juvenile fish.

The FRCC recommends that the question of mesh size be addressed in a comprehensive manner for groundfish in the NAFO Regulatory Area, with a view to increasing minimum mesh size to 145 mm. Such a process should start with the preparation of a report by DFO on the impact of a change in mesh size from 130 mm to 145 mm (in terms of yield per recruit, spawners per recruit, and changes in catch rates in the short and long term). This report should also document the mean size and age of entry in fisheries using such mesh sizes, and relate these to the mean size and age at first maturity. Ultimately, a forum for scientists, fisheries managers and industry should be convened to assess the conservation impacts of such an increase in mesh size.

In conjunction with increased mesh sizes, Canadian Conservation Harvesting Plans also establish minimum fish sizes. Such minima, while in place for Canadian industry on transboundary stocks, are not the same in the NAFO Regulatory Area. Where Canadian minimum sizes differ from those of NAFO, the FRCC has recommended a minimum size: each of these recommendations represents an increase from the current NAFO-established minimum fish size.

The FRCC recommends that minimum fish sizes be established as recommended in this report.

The Council recognizes that recommendations for increases in mesh sizes and minimum fish sizes may appear to be at odds with recommendations for moratoria on fishing in some stocks. The need for adoption of these conservation measures is clear, and their adoption now will allow contracting parties to prepare for their implementation should fishing on these stocks be re-opened in future years.

Conservation measures such as those outlined here have been implemented in domestic Canadian fisheries. Their implementation in transboundary stocks in the NAFO Regulatory Area would ensure that Canadians are not unfairly bearing the burden of conserving fishery resources.

## 5. THE CANADIAN NAFO POSITION

The FRCC fully supports a Canadian position with the following objectives:

1. **The implementation of an enforcement and reporting program that is truly effective. A continuation of the observer program and consistency in its application among all NAFO Contracting Parties is essential.**
2. **The adoption of the above recommendations on the setting of TACs and other conservation measures.**
3. **The continuation of the moratorium on fishing shrimp in 3LNO.**
4. **An increase in minimum mesh size to 145 mm to ensure increased protection of juvenile fish, with the exception of redfish.**
5. **The NAFO by-catch regime be amended to ensure that bycatches are truly incidental.**
6. **Minimum fish sizes must be increased to ensure increased protection of juvenile fish.**
7. **The limitation of fishing effort on unregulated species and the establishment of sustainable harvest levels for these fisheries.**
8. **The continuation of diplomatic efforts to eliminate uncontrolled fishing by non-contracting parties and the reflagging of vessels in an effort to circumvent conservation requirements in the NAFO Regulatory Area.**

We trust that these recommendations are helpful, and wish you and the Canadian delegation well in the upcoming NAFO meetings.

Sincerely yours,

Fred Woodman

Fred Woodman
Chairman

# COD - 3NO

## ANALYSIS

In 1999, the NAFO Scientific Council noted:

- the spawning stock biomass continues at an extremely low level.
- the lack of recruitment since 1990, which may be due to catches of small fish, or due to reduced productivity of this stock.
- that if the productivity of this stock has decreased, the time to recovery of this stock will increase.

The FRCC is concerned about the prospects for this stock, and notes that any by-catch of this stock in other directed fisheries will even further lengthen the time to recovery. The FRCC also noted that recent Canadian surveys indicate potential signs of stronger recruitment in 1998. If this is the case, these fish must be protected.

## HISTORY OF FRCC RECOMMENDATIONS

In 1994, the NAFO Scientific Council warned that the spawning stock biomass could not begin to recover unless the 1989 and 1990 year-classes survive to maturity. In particular, they indicated that rebuilding would not happen if fisheries on immature fish were to continue at the then current high levels. In June 1995, NAFO scientists indicated that this stock was at an all time low in 1994 and was represented mainly by 2 year-classes (those of 1989 and 1990). They also noted that the year-classes since 1990 appeared to be weak and the estimates of the 1989 and 1990 year-classes, which had been believed to be average, were much lower than previously estimated. The NAFO Scientific Council recommended that there be no direct fishing for cod in 1996, 1997 and again in 1998 and that by-catches in fisheries targeting other species should be kept at the lowest possible level. Their recommendations are unchanged for 1999 and the Council points out that the most recent surveys suggests that all year-classes are now at a low level and the 1996 biomass is estimated to be at an extremely low level.

In its August 1994, 1995, 1996, 1997 and 1998 letters to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended a continuation of the moratorium.

In September 1997, the NAFO Fisheries Commission agreed to continue the moratorium (in place since 1995) on directing for cod in 3NO in 1998.

In 1998, the FRCC shared the NAFO Scientific Council concern with the current low levels of biomass and

## RECOMMENDATIONS

**The FRCC supports the NAFO Scientific Council recommendation that:**

1. **there be no directed fishing for 3NO cod in 2000.**

**In addition, the FRCC recommends that:**

2. **the NAFO by-catch regime be amended to ensure that by-catches of cod are truly incidental;**
3. **a minimum fish size of 45 cm be set for 3NO cod; and,**
4. **DFO should carefully monitor cod by-catch in the various directed fisheries in 3NO and take effective measures (e.g. area and/or seasonal closures, 100% observer coverage, etc.) to address any emerging problems.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 33 | 33 | 33 | 40 | 25 | 18.6 | 13.6 | 13.6 | 10.2 | 6 | Moratorium | | | | |
| Catch | 34.8 | 50.7 | 41.8 | 43.1 | 32.9 | 29 | 29 | 12.6 | 9.7 | 2.7 | 0.2 | 0.17 | 0.42 | 0.6 | 0.51 |

*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

the lack of recruitment for this stock. Survey data used in estimating recent year-classes indicates that recruitment has been almost non-existent since the 1990 year-class. The medium term indicated poor prospects due to low spawner biomass, low recruitment and high mortality. Recovery will require a number of relatively strong year-classes that survive to maturity, rebuilding the spawner biomass. Consequently, the Council considered that no directed fishing should take place in 1998 and that by-catches should be kept to the lowest possible level.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low level |
| | *Compared to average* |
| Spawning biomass: | likely at very low level |
| Total Biomass: | at historically low levels |
| Recruitment: | all year classes at low levels; maybe increase in 1998 |
| Growth and Condition: | no special comment |
| Age Structure: | all year classes weak |
| Distribution: | no special comment |
| Recent Exploitation Level: | under moratorium since 1994 |

# AMERICAN PLAICE - 3LNO

## ANALYSIS

In 1999, the NAFO Scientific Council observed:

- no good year-classes have appeared in this stock since the mid-1980s.
- total mortality remains high on young fish.
- catches of this stock as by-catch in other fisheries have more than doubled since 1995.

The NAFO Scientific Council advises that there have been no strong year classes since the mid-1980s. Even in the absence of a directed fishery since 1995, this stock remains at a low level. Catches have more than doubled since 1995 to 1600t in 1998 despite the moratorium: this increase is mainly due to the catch of plaice in the Greenland halibut and yellowtail flounder fisheries, and in the unregulated skate and grenadier fisheries in the NAFO Regulatory Area. The FRCC has great concern about the continuing increase in exploitation of this resource under moratorium, with catches of this stock as by-catch in other fisheries having doubled since 1995.

## HISTORY OF FRCC RECOMMENDATIONS

In the June 1994 Report of the NAFO Scientific Council, scientists indicated that the abundance of American plaice in 3LNO was at a record low level, making stock rebuilding uncertain and recommended no fishing for 1995. Concerns persisted and their recommendations for 1996 and 1997 echoed those for 1995, but adding that by-catches should also be reduced to the lowest possible level. Given the extremely low population size, the concerns with respect to the spawning biomass, and the apparently large mortality on juvenile plaice, the NAFO scientists continued their recommendation for 1998 and for 1999.

In its letters of August 1994, 1995 and 1996 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended continuing the moratorium for American plaice in Divisions 3LNO. The Council also pointed at the need to address the concerns raised by the exploitation of immature fish in directed fisheries by non-Contracting Parties, as well as the suspected high and increasing by-catches of American plaice in the Greenland halibut fishery by both Contracting and non-Contracting Parties. The Council was particularly concerned with the low levels of biomass and the apparent lack of recruitment for this stock.

In its August, 1997 letter to the Minister of Fisheries and Oceans, the FRCC again recommended continuing

## RECOMMENDATIONS

**The FRCC supports the NAFO Scientific Council recommendation that:**

1. **there be no directed fishing for American plaice in Divisions 3LNO in 2000.**

**In addition, the FRCC recommends that:**

2. **the NAFO by-catch regime be amended to ensure that by-catches of American plaice are truly incidental;**
3. **a minimum fish size of 30 cm be set for 3LNO American plaice;**
4. **key juvenile nursery grounds be protected through the establishment of closed areas; and,**
5. **there continue to be 100% observer coverage in directed fisheries where American plaice is a by-catch.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 49 | 55 | 48 | 40 | 30.3 | 24.9 | 25.8 | 25.8 | 10.5 | 4.8 | Moratorium | | | | |
| Catch | 48 | 57.4 | 53.6 | 38.2 | 40.8 | 32.5 | 34.7 | 13.4 | 17.1 | 7.4 | 0.6 | 0.9 | 1.4 | 1.6 | 0.26 |

*Catch as of Nov. 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

the moratorium for 1998 including implementing measures to minimize by-catches in the Greenland halibut fishery including an increase in the minimum mesh size to 145 mm. The Council also recommended protecting juvenile nursery grounds through the establishment of closed areas to all fishing activity.

In September 1997, the NAFO Fisheries Commission agreed to continue the moratorium (in place since 1995) on fishing 3LNO American plaice in 1998 but did not increase mesh size or implement any other measures to protect juvenile nursery areas.

In 1998, the NAFO Scientific Council noted that the stock was at a low level, that the biomass was not increasing and that abundance continued to decrease, and that the stock consisted manly of fish less than 7 years old with no good year classes appearing since 1987.

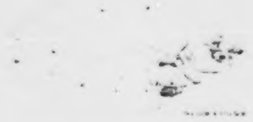
The FRCC, in 1998, recommended there be no directed fishery for American plaice in 3LNO in 1999, and recommended conservation measures to protect this stock, including a minimum mesh size of 145mm, by-catch minimization, closed juvenile areas, and 100 per cent observer coverage.

The FRCC also noted the continuing decline of this stock despite the moratorium, and its belief that a recovery of this stock is unlikely in the short term.

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low |
| | *Compared to average* |
| Spawning biomass: | very low |
| Total Biomass: | very low |
| Recruitment: | no good year-classes since mid-1980s |
| Growth and Condition: | no special observation |
| Age Structure: | stock composed mainly of fish < 7 years old |
| Distribution: | no special observation |
| Recent Exploitation Level: | under moratorium |

# YELLOWTAIL FLOUNDER - 3LNO



## ANALYSIS

In its 1999 report, the NAFO Scientific Council noted:

- the stock size has continued to increase.
- the 1993 year-class is the strongest in the time series.
- the 1994 and 1995 year classes, while weaker than the 1993 year class, were the next highest in the time series.
- the biomass is at the level of the mid-1980s.

The NAFO Scientific Council recommended a TAC of 10,000t for 2000, but did not recommend a restriction of the fishery to 3NO as it had in the past. This TAC recommendation was also made without consideration of possible by-catches of 3LNO American plaice in this fishery.

In its August 1999 letter to the Minister of Fisheries and Oceans, the FRCC continued to focus on the by-catches of cod and American plaice in the fishery. The Council also noted that the exploitable biomass for this stock is based upon swept area estimates, which assume that the trawl survey gear catches all fish between the wing ends of the net. This assumption may lead to under or overestimation of the actual biomass. The Council considered that DFO should move as soon as possible to establish a better estimate of the biomass of this stock.

## HISTORY OF FRCC RECOMMENDATIONS

In its June 1994 report, the NAFO Scientific Council noted that the stock remained at a low level and that potential growth on the relatively large 1984-86 year-classes had not occurred, likely because of large catches of these cohorts as juveniles by fisheries in the Regulatory Area, and because the TAC had been exceeded each year from 1984. To rebuild this stock as fast as possible, NAFO scientists recommended that no fishing be permitted in 1995.

In June 1995, the NAFO Scientific Council re-affirmed its previous concerns and also noted that the geographic distribution of this stock had contracted, making it very vulnerable to over-exploitation. They

## RECOMMENDATIONS

**The FRCC accepts the NAFO Scientific Council recommendation that :**

1. **the TAC for 3LNO yellowtail flounder be set at 10,000t in 2000.**

**In addition, the FRCC recommends that:**

2. **the NAFO by-catch regime be amended to ensure that by-catches of yellowtail flounder are truly incidental;**
3. **measures be undertaken to minimize the by-catch of American plaice and cod in this fishery;**
4. **key juvenile nursery grounds be protected through the establishment of closed areas;**
5. **a minimum fish size of 30 cm be set for 3LNO Yellowtail flounder;**
6. **fishing on peak spawning concentrations be minimized; and,**
7. **there continue to be 100% observer coverage in this fishery.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 15 | 15 | 15 | 15 | 5 | 5 | 7 | 7 | 7 | 7 | Moratorium | | | 4 | 6 |
| Catch | 29 | 30.2 | 16.3 | 15 | 9.1 | 13.8 | 16.3 | 10.2 | 13.6 | 2.1 | 0.1 | 0.4 | 0.8 | 4.4 | 5.28 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

recommended that there be no directed fishing in 1996 and that by-catches be reduced to the lowest possible level, a recommendation repeated for 1997. In 1997, the scientists noted that based on 6 additional surveys since the 1996 assessment, the current view was that the stock size had increased since 1994 although the level of this increase could not be quantified. The Scientific Council noted that the stock could sustain a limited fishery in 1998 and recommended that the TAC not exceed 4,000t. Scientists noted that a precautionary approach should be taken, however, as any directed fishery for yellowtail would result in by-catches of American plaice and cod.

In 1998, the Scientific Council recommended a TAC of 6,000t for 1999 and re-emphasized its caution regarding by-catches of American plaice and cod. It noted in particular that, based on 7 surveys conducted since 1994, the stock size had increased, and that the 1992 and 1993 year classes were well above the long-term average (since 1984).

In its letters of 1994, 1995 and 1996 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended the continuation of the moratorium for 1995, 1996 and 1997. The Council also pointed out the need to address the concerns raised by the exploitation of immature fish in the directed fisheries in the Regulatory Area by non-Contracting Parties. The Council was particularly concerned with the low levels of biomass and the lack of recruitment for this stock.

At its September 1996 meeting, the NAFO Fisheries Commission agreed to continue the moratorium in 1997 (in place since 1995).

In August 1997, the FRCC recommended a TAC of 4,000t for 1998, provided a number of specific conditions were met to protect juvenile yellowtail as well as to keep by-catches of American plaice and cod to the lowest possible level. The NAFO Fisheries Commission set the 1998 TAC at 4,000t.

In 1998, the FRCC recommended that the 1999 TAC not exceed 6,000t, and that a carefully monitored directed fishery be contained to Divisions 3NO. The Council also noted its ongoing concern regarding by-catches of American plaice and cod in this fishery, and made recommendations to protect juvenile fish and minimize fishing on spawning concentrations. The NAFO Fisheries Commission set the 1999 TAC at 6,000t.

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | gradual improvement |
| | *Compared to average* |
| Spawning biomass: | improving |
| Total Biomass: | appear to have returned to a level close to that of the mid-1980s |
| Recruitment: | the 1993, 94 and 95 year-classes well above average |
| Growth and Condition: | weight at age stable |
| Age Structure: | stable, with several cohorts |
| Distribution: | mainly concentrated in 3NO; low in 3L but some expansion in 3L may be taking place |
| Recent Exploitation Level: | has been reduced due to moratorium |

# WITCH FLOUNDER - 3NO

## ANALYSIS

In 1999, the NAFO Scientific Council observed:

- the 1998 biomass is the lowest ever observed.
- the stock is at a low level and data suggests the decline continues despite a moratorium on fishing for this stock since 1995.History Of FRCC Recommendations:

In June 1994 the NAFO Scientific Council indicated that this stock was likely at a very low level and recommended that no fishing be permitted on witch flounder in Divisions 3NO in 1995 in an effort to rebuild this stock to former levels. The Scientific Council re-iterated the same recommendation for 1996 but added that by-catches should also be reduced to the lowest possible level. The scientists made the same recommendations for 1997 and 1998.

In its letters of August 1994, 1995, 1996 and 1997 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended no directed fishery of this stock.

In September 1997, the NAFO Fisheries Commission agreed to continue the moratorium (in place since 1995) on fishing 3NO witch flounder in 1998, and to keep by-catches to the lowest possible level.

In 1998, the NAFO Scientific Council noted that the 1998 biomass estimate was the lowest observed, that the data suggested the stock was continuing to decline, and that the stock remained at a low level.

In 1998, the FRCC recommended that the moratorium on directed fishery for this stock be continued, and that by-catches be kept to the lowest level possible.

HISTORY OF FRCC RECOMMENDATIONS

In June 1994 the NAFO Scientific Council indicated that this stock was likely at a very low level and recommended that no fishing be permitted on witch flounder in Divisions 3NO in 1995 in an effort to rebuild this stock to former levels. The Scientific Council re-iterated the same recommendation for 1996 but added that by-catches should also be reduced to the lowest possible level. The scientists made the same recommendations for 1997 and 1998.

In its letters of August 1994, 1995, 1996 and 1997 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended no directed fishery of this stock.

In September 1997, the NAFO Fisheries Commission agreed to continue the moratorium (in place since 1995) on fishing 3NO witch flounder in 1998, and to keep by-catches to the lowest possible level.

In 1998, the NAFO Scientific Council noted that the 1998 biomass estimate was the lowest observed, that

## RECOMMENDATIONS

**The FRCC supports the NAFO Scientific Council recommendation that :**

1. **there be no directed fishing for 3NO witch flounder in 2000.**

**In addition, the FRCC recommends that:**

2. **the NAFO by-catch regime be amended to ensure that by-catches of witch flounder are truly incidental; and,**
3. **a minimum fish size of 30 cm be set for 3NO witch flounder.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | Moratorium | | | | |
| Catch | 8.8 | 9.1 | 7.6 | 7.3 | 3.7 | 4.2 | 4.8 | 5 | 4.4 | 1.1 | 0.3 | 0.4 | 0.5 | 0.6 | 0.24 |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

the data suggested the stock was continuing to decline, and that the stock remained at a low level.

In 1998, the FRCC recommended that the moratorium on directed fishery for this stock be continued, and that by-catches be kept to the lowest level possible.

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low |
| | *Compared to average* |
| Spawning biomass: | likely at low level |
| Total Biomass: | low; the 1998 survey estimate is lowest observed |
| Recruitment: | no observation |
| Growth and Condition: | no observation |
| Age Structure: | no data |
| Distribution: | no special observation |
| Recent Exploitation Level: | under moratorium. |

# REDFISH - 3LN

## ANALYSIS

In 1999, the NAFO Scientific Council makes the following observations:

- biomass low in 3L, where poor recruitment has persisted since early 1980s.
- little or no sign of good recruitment since 1986 and 1987 year classes, which are now recruiting to the spawning stock biomass.
- stock at a very low level.

## HISTORY OF FRCC RECOMMENDATIONS

In its 1994 report, the NAFO Scientific Council noted that there was no estimate of recruitment available but that it appeared poor in Division 3L since the early 1980s and that available indices exhibited considerable between-year variability but generally indicated a stock at a low level, especially in 3L. Their recommendation for 1995 was for a total catch not to exceed 14,000t.

In its June 1995 report, the Scientific Council concluded that redfish abundance was very low in Division 3L, with no sign of good recruitment. In Division 3N, they observed that the stock has declined from 1984 to 1991 but that "the status since then is uncertain`` and made the same recommendation for 1996 as for 1995. In 1996, NAFO scientists, although noting that there was concern for the future given the general lack of good recruitment, had no basis to change their previous recommendation and for 1997 recommended that catches should not exceed 14,000t. In its June 1997 report, the Scientific Council noted that the stock appeared to be at a very low level and recommended that there be no directed fishing in 1998 and by-catches be kept at the current low level, recommendations that were accepted by the Fisheries Commission.

In its 1998 and 1999 report, NAFO scientists reaffirmed earlier statements that, based on available data, the stock appears to be at a very low level. Some increase in 3N may be due to growth of the relatively strong 1986-87 year-classes. They recommend continuation of no directed fishing in 1999 and that by-catches be kept to the lowest possible level.

The Fisheries Resource Conservation Council made no specific recommendation on this stock for 1995. In its August 1995 letter to the Minister of Fisheries and Oceans, the Council concluded that a cautious approach was crucial and that the TAC for 1996 should be substantially reduced from the then current level of 14,000t, probably to a level below the 1994 catch of 7,000t. The NAFO Fisheries Commission reduced the 1996 TAC to 11,000t.

In its August 1996 letter to the Minister of Fisheries and Oceans, the FRCC recommended a substantial reduction in this TAC. In September 1996, the NAFO Fisheries Commission set the TAC for 1997 at 11,000t.

## RECOMMENDATIONS

**The FRCC supports the NAFO Scientific Council recommendation that:**

1. **there be no directed fishing for 3LN redfish in 2000.**

**In addition, the FRCC recommends that:**

2. **the NAFO by-catch regime be amended to ensure that by-catches of redfish are truly incidental; and,**
3. **every effort be made to protect the 1986 and 1987 year classes.**

*Figures are in 000t*

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 25 | 25 | 25 | 25 | 25 | 25 | 14 | 14 | 14 | 14 | 14 | 11 | 11 | Moratorium | |
| Catch | 20.6 | 42.8 | 71 | 44.2 | 32 | 29.1 | 25.8 | 27.3 | 21 | 6 | 2 | 0.5 | 0.6 | 1.6 | 0 |

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

The FRCC also cautioned that any expansion of the 3M shrimp trawl fishery into 3LN should be discouraged. The FRCC noted with concern the high discard rate of small flatfish and redfish in other shrimp fisheries and the effect this could have on recruitment and loss of yield for these stocks, which were at critically low levels. Given these reasons, the FRCC recommended that the approach taken by Canada at NAFO in the previous year with respect to any 3LN shrimp trawl fishery be continued.

In its August 1997 and 1998 letters, the FRCC recommended continuation of the moratorium for 1998 and 1999 and that by-catches be kept to the lowest possible level. The Council also re-iterated its concern regarding expansion of the 3M shrimp fishery into 3LN.

The FRCC noted that the catch in 1997 (600t) was the second lowest historically (453t in 1996) and considered that the shortfall of the catch below the TAC in recent years is largely the result of unsuccessful commercial fisheries carried out by member states. This is likely an indication of the poor status of the stock. With no sign of good recruitment since the 1986-87 year classes, the prospects for rebuilding the 3LN redfish stock are poor.

The Council continues to believe that an expansion of the shrimp trawl fishery from 3M to 3LN should be discouraged so that juvenile redfish are given maximum protection. The Council believes that the approach taken by Canada at NAFO with respect to this possible expansion should be continued.

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | very low |
| | *Compared to average* |
| Spawning biomass: | likely very low level |
| Total Biomass: | very low level |
| Recruitment: | little sign of good recruitment after 1986-87 year classes |
| Growth and Condition: | typically slow growth |
| Age Structure: | dominated by 1986-87 year classes |
| Distribution: | no special comment |
| Recent Exploitation Level: | low; reduced effort since 1994 |

# GREENLAND HALIBUT - 2 + 3KLMNO

## ANALYSIS

In 1999, the NAFO Scientific Council makes the following observations:

- above average recruitment is indicated for all year classes from 1990-95, but 1996 and 1997 are lower.
- indices of fishable biomass well below average in 1998, but should increase as some of these year classes recruit to fishable status.

The NAFO Scientific Council notes that while it is unable to advise on a specific TAC for 2000, an increase in catch to about 30,000t is likely to allow the stock to continue to increase. It also recommends that measures be considered to reduce, as much as possible, the exploitation of juveniles and the by-catch of American plaice. The FRCC is encouraged by the signs of good recruitment and notes that continued conservation measures would allow these year classes to grow and contribute to the spawning biomass in the near future provided that juveniles receive adequate protection.

Despite these positive signs, the Council continues to believe it would be premature at this stage to increase catch levels until the stock has benefited more substantially from this recruitment.

The Council notes that catches from this stock continue to consist mainly of immature fish and believes that additional measures such as increased mesh size and small fish protocols should be implemented in the NAFO Regulatory Area so as to be consistent with similar practices inside the Canadian zone.

The Council wrote to the Minister of Fisheries and Oceans prior to the 1999 NAFO Meeting stating that it did not support the NAFO Scientific Council's view that the catch level in 2000 could increase to about 30,000t, unless appropriate measures are implemented to improve conservation. At its September 1999 meeting, NAFO subsequently set the TAC at 35,000t.

## RECOMMENDATIONS

**The FRCC does not accept the NAFO Scientific Council recommendation that:**

1. **a catch of 30,000t be set in 2000.**

**The FRCC feels that the implementation of measures to protect juvenile fish for this stock are essential and therefore recommends that:**

2. **a minimum fish size of 45 cm be set for 2+3KLMNO Greenland halibut;**
3. **the by-catch of American plaice, cod and other species be kept at the lowest possible levels;**
4. **the by-catch of Greenland halibut in the Canadian and international shrimp fisheries be closely monitored and kept at the lowest possible levels; and,**
5. **in light of emerging recruitment in this fishery, measures be taken to implement a sustainable harvest, including:**
   - **100% observer coverage in the NAFO Regulatory Area; and,**
   - **the development of a plan by the Department in consultation with industry to deal with juvenile catches in the Canadian zone.**

**The FRCC recommends that any consideration of a TAC level above 27,000t should only be undertaken if these conservation and enforcement measures are implemented.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 75 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 25 | 27 | 27 | 27 | 27 | 33 |
| Catch | 20.3 | 18 | 32.4 | 18.4 | 18.9 | 47.4 | 65.0 | 63.2 | 42-62 | 51 | 15 | 19 | 20 | 20 | |

*Catch as of Nov 19/99

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## NEW RECOMMENDATION IN JANUARY 2000

RV surveys indicate that recruitment prospects for this fishery are good. With the expanding shrimp fishery in 2J and 3K concerns have been expressed on the effect of this fishery on young turbot particularly in St. Anthony Basin and Hawke Channel. The Council notes that the mandatory use of the Nordmore grate and the use of long toggle chains has done much to reduce by-catch in this fishery. However, with the significant effort exerted by 300 + vessels in a 90 + million pound fishery even lower percentage of by-catch of very small turbot is not in the best interest of the 2+3KLMNO turbot stock complex nor in the long term interest of the industry.

**1. The FRCC recommends that consultations begin immediately with industry and Science to designate sizeable portions of St. Anthony Basin and Hawke Channel as juvenile turbot reserves and be closed to shrimp trawling for the 2000 fishing season and beyond.**

## HISTORY OF FRCC RECOMMENDATIONS

In August 1993, the Fisheries Resource Conservation Council called for significant reductions in catches in the NAFO Regulatory Area and for a joint commitment to address scientific questions related to stock structure. For 1994, the FRCC concluded that the TAC should be reduced substantially and that catches in the order of the historical catch level of 25,000t should be a maximum level.

In June 1994, the FRCC noted the absence of controls on the foreign fishery outside 200 miles and recommended that all means be taken by Canada to limit the effort on this stock. In November 1994, the Council reiterated that catches in the order of the historical catch level of 25,000t should be a maximum level.

The NAFO Scientific Council concluded in June 1995 that the TAC for Greenland halibut in 2+3KLMNO should continue to be set at levels well below the catches achieved in previous years until it became clear that the stock was increasing. In addition, the Scientific Council recommended that measures be considered to reduce, as much as possible, the exploitation of juvenile Greenland halibut.

In August 1995, the FRCC re-iterated the need for maintaining reduced TACs. The conclusion of the Scientific Council that the large catches of immature Greenland halibut were a major impediment to stock rebuilding was noted. The Council suggested that Canada's objective for the near future should be to rebuild the stock to biomass levels of the early 1980s in order to support a sustainable fishery in the long-term. The NAFO Fisheries Commission concluded at the September 1995 meeting that the 1996 TAC would be set at 20,000t for Greenland halibut in 3LMNO, with an additional TAC of 7,000t to be allowed in SA2+3K (Canada only).

In 1996, the Council indicated that the above-average year-classes from the 1990's must be protected to allow the stock to rebuild and that catching large numbers of these fish as juveniles would waste the potential for rebuilding the stock. In September 1996, the NAFO Fisheries Commission concluded that the 1997 TAC would continue to be set at 20,000t for Greenland halibut in 3LMNO. The Canadian quota for 1997 in

### COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock Indicator: | improving |
| | *Compared to average* |
| Spawning biomass: | fishable biomass still below average |
| Total Biomass: | continuing to show signs of recovery |
| Recruitment: | good year-classes since 1990-95 |
| Growth and Condition: | no special observation |
| Age Structure: | older age-groups remain at low levels |
| Distribution: | |
| Recent Exploitation Level: | reduced in 1995 and 1996 |

2+3K was established at 7,000t in keeping with the FRCC recommendations. Again for 1998, the Council recommended the Canadian quota in 2+3K remain at 7,000t.

During the 1998 FRCC consultations, concern was raised regarding the extent of by-catch of this stock in the new 3K shrimp fishery. It was noted that the distribution of this stock has changed over time. The stock used to be fished in the Bays but is now more of an offshore fishery in deeper water. In Clarenville, stakeholders noted that both this and the stock in 0+1 were becoming important stocks for fishermen in the north and in Sub-area 2+3.

# CHAPTER 3: GROUNDFISH STOCKS IN THE GULF OF ST. LAWRENCE

# LETTER TO THE MINISTER

April 7, 2000

The Honourable Herb Dhaliwal, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister,

The Fisheries Resource Conservation Council (FRCC) herewith presents to you its report on 2000/2001 Conservation Requirements for Groundfish Stocks in the Gulf of St. Lawrence.

The advice which we provide is to maintain catch levels on many stocks: for some stocks this status quo represents an attempt to continue the rebuilding underway, such as for 4TVn cod, while for others, it reflects uncertainties about the condition of the stock.

Over the next year, the Council will undertake discussions with stakeholders in the fishing industry, with scientists and fisheries managers within your Department to begin the development of strategies, objectives and indicators for the stocks within the FRCC's mandate.

The process that led to the assessment of the 3Pn4RS cod stock troubles the Council: the exclusion of industry participants from the Regional Assessment Process meeting has led many stakeholders to question the assessment itself. It is the Council's view that these assessments are strengthened not only by understanding the process which led to them, but also by a clear understanding of the roles and responsibilities of the various groups involved, including scientists and industry stakeholders. The Council will work with these groups to ensure that these roles and processes are clear.

Once again, in this report, for many stocks, the Council has attempted to better reflect the rationale underlying its recommendations through both a change in format and a change in content. As I indicated to you in January 2000, it is our intent to continue this in future reports, in order to allow a more transparent view of our work.

Sincerely,

Fred Woodman

Fred Woodman
Chairman

## INTRODUCTION

This is the second FRCC report dedicated to groundfish stocks in the Gulf of St.-Lawrence. In keeping with its mandate and philosophy, the FRCC is trying to make more explicit the ecosystemic approach stated in its terms of reference.

As indicated in the Council's report of January 2000, the Council is continuing to modify the format of its reports. Common conservation issues are grouped in a single section. As in previous reports, ecosystem issues are raised. For each stock, a general perspective describes an overview of the fish population, fishery and trends. Instead of separating scientific and fishing industry information from consultations and briefs in separate sections, we have incorporated these in a common text leading to specific recommendations. By incorporating recommendations into the text, we hope to make clearer why those recommendations are made.

This is another step in changing our reports. Several aspects have yet to be fine-tuned. In the future, stock-specific strategies and objectives will be developed and the structure of our reports will continue to evolve as this occurs. This implies the definition of objective, measurable indicators that we can follow. Such strategies, objectives and indicators have to be discussed with stakeholders generally, with industry, scientists and fisheries managers, before they can be adopted by the Council. It is the Council's intention to undertake such discussion in the next year.

## GENERAL CONSERVATION MEASURES

**The FRCC feels it is not necessary to reiterate every recommendation made in past reports. Unless clearly stated otherwise, those recommendations are still valid.**

Several principles are valid for every stock and are explained in the Council's 1997 Groundfish Conservation Framework for Atlantic Canada (FRCC.97.R.3). As basic principles, the Council adopted the following:

- Recruitment fishing must be avoided; small fish are to be protected and by-catches of those fish should be kept at the lowest possible level;
- Significant removals of a single year-class must be avoided;
- Fishing on concentrations during peak spawning period should be minimised;
- Fishing activities should not be concentrated in one period and/or in one geographical area, in order to protect the diversity of stock components;
- In gillnet fisheries, gear must be tagged to identify its owner; gillnets must be regularly tended; other measures, as necessary, must be implemented to limit gear losses in order to prevent ghost fishing;
- Sentinel Fisheries Programs and joint Science-Industry Research Programs must be continued and expanded, even after fisheries reopen;
- DFO should implement Dockside Monitoring Programs and at-sea Observer Programs for every groundfish fishery, in order to get reliable estimates of total fish removals from every stock;
- Sentinel fisheries programs, joint Science-Industry Research Programs, Dockside Monitoring and Observer programs, and reporting systems must be consistent among areas and regions;
- Log-books be made compulsory for all groundfish fisheries and the data obtained should be processed in order to provide useful information on fishing activities and results;
- Discarding, especially in flatfish fisheries, must be minimized;
- For American plaice, witch flounder and white hake, these stocks are generally considered to overwinter outside the Gulf and, thus, the management units do not take into consideration the winter portion of the population; clarifications on the distribution range and migration patterns of those stocks are needed.

The FRCC is still concerned about the fishing capacity exerting heavy pressure on Gulf groundfish stocks, which for the most part, are in a precarious state.

## RECOMMENDATIONS DEALING WITH THE ECOSYSTEM

### Seals

The growing seal population appeared as a major concern during the public consultations held by the Council. The FRCC, along with the fishing industry, is concerned that the predation pressure exerted by seals could severely postpone any significant recovery of the cod stocks. The FRCC recognises that the ecosystem effects of predation by seals are complex in nature and that the short- and long-term effects of a reduction in seal herds on the recovery of cod are still being researched. The FRCC also recognises that seals constitute a renewable resource and that a significant effort has been made in recent years to establish the foundation of a viable industry around the harvest of seals. Nevertheless, the FRCC still believes that its report on this issue released in 1999 (FRCC.99.R4, p 120) contained recommendations that need to be included in a comprehensive seal-harvest management plan.

**The FRCC recommends that the measures proposed in its report to reduce the seal population be included in a comprehensive seal-harvest management plan.**

### Oil and Gas Exploitation

During FRCC's consultations in the southern part of the Gulf, a major concern was expressed about the developing oil and gas exploration, leading to possible exploitation.

Several scientific works have described the detrimental effect of seismic blasting on every life stage of fish. It is also known that drilling releases toxic element in the environment. Oil and gas exploitation thereby becomes a conservation issue that the FRCC cannot ignore.

The Gulf of St. Lawrence is a semi-confined highly productive environment. Any activity that would have a negative impact on that productivity must be closely assessed and monitored.

**The FRCC recommends that any oil and gas production activities in the Gulf of St. Lawrence, from exploration to production phase, be postponed until a complete assessment, made through a transparent process, on the potential impact of those activities on the marine life is made.**

Considering the fragility of the ecosystems involved and the numerous people dependent on these ecosystems, the FRCC believes that such an assessment justifies the cost of completing the study.

## OCEANOGRAPHIC CONDITIONS

In 1999, the annual air temperature was warmer than normal in the Gulf of St. Lawrence. The average flow of the St. Lawrence River was lower than normal. The Cold Intermediate Layer was thinner and warmer than in 1998, but it remained below normal. In the Magdalen Shallows, the area with sub-zero bottom temperatures decreased. The bottom temperatures in the northern region were warmer than normal.

# COD - 3PN4RS

## PERSPECTIVE

The stock is located north of the Laurentian Channel, west of Newfoundland and on the lower north shore of the Gulf of St. Lawrence. It overwinters outside the Gulf, in the 3Pn area. Scientific evidence shows that it also appears further east, on the Burgeo Bank.

This cod stock was the most productive of the two Gulf cod stocks, with catches regularly above 50,000t until the late eighties, and some years above 100,000t.

Prior to 1994, this stock experienced the effects of poor fishing practices (harvesting of undersized fish, dumping, highgrading, misreporting, etc.). Overfishing combined with poor environmental conditions may explain the sharp decline observed in the early nineties, which led to the closure of the fishery in 1994. The fishery reopened in 1997.

## ANALYSIS

The analytical model applied by scientists in February 2000 shows a more negative outlook than the 1999 assessment. The Stock Status Report (SSR) shows a higher than anticipated fishing mortality in 1999, exceeding $F_{0.1}$. According to the model used, the 1999 catches induced an exploitation rate of 26% for fully recruited cod (*i.e.* ages 7 and older). A decline in age of maturity and seal consumption on the order of 10-30 thousand tonnes in 1999 were also reported. Despite the low catches, compared to historical levels, the age structure of the population is not improving, which is usually a sign of high mortality rates.

The 2000 SSR states that in order to achieve an expected 10% growth in the adult biomass it would be necessary to reinstitute a moratorium on fishing in 2000. The SSR also reports that a TAC of 7500 t in 2000 (*status quo*) could prevent growth of the adult segment of the stock.

Abundance indices used in the population analysis were reduced from 8 indices in 1999 to the 5 indices used in the 2000 assessment of the stock status. The methodology for incorporating seal consumption of cod and the different treatment of certain strata in the research vessel survey was different in 2000 than in 1999. The FRCC notes, once again, that the year-over-year change in the formulation of the population analysis model causes problems in interpreting the results of this analysis.

In 1999, based on the assessment provided in the DFO SSR, and also based on the views of stakeholders, the FRCC recommended a TAC of 7500t. The information contained in the 1999 assessment indicated a probability of some growth in spawning stock biomass from fishing at that level. Given the significant differences between the 1999 and 2000 assessments outlined above, it is difficult to ascertain whether or not this growth occurred. The current Stock Status Report estimates that the spawning stock biomass in 2000 is approximately 62,000t compared to 55,000t estimated for the 1999 SSB from the 1999 SSR, but the direct comparison of these numbers is virtually impossible given the different methodologies used to obtain them.

Fishermen again present a different perspective on stock status and continue to report improved catch rates, especially in 4R, and an increase in cod size and condition. Longline sentinel fishermen recorded their highest catch rates in the series in 1999. In addition, environmental conditions were more favourable in the area. The growth rate appears to be good and there are also reports of improved fish fecundity at age. The 1993, 1995 and 1996 year classes are relatively high and will contribute to stock recovery. Early indications are that the 1997 year class is the highest in the last decade. The observed decline in the mobile sentinel fishery catch rates may be explained by gear interference from the ongoing commercial fishery.

Many stakeholders recommended a minimum of *status quo* fishing levels (7500t) for 2000/2001, and one industry group recommended an increase in TAC to 8500t in 2000/2001.

**The FRCC recommends that the 2000/2001 TAC for 3Pn4RS cod be set at 7000t.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 100 | 92.1 | 80.3 | 73.9 | 76.5 | 58 | 35 | 35 | 18 | Moratoruim | | | 6 | 3 | 7.5 |
| Catch | 87.3 | 82 | 66.5 | 43.7 | 44.8 | 37.5 | 31.8 | 30.6 | 17.7 | 0.5 | 0.09 | 0.03 | 4.3 | 3.1 | 7.02 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

This recommendation signals the Council's concern with the view expressed in the SSR while taking into account the more optimistic view of stock status reported by industry. Once again, the Council has difficulty in balancing the conflicting views presented in the SSR and those presented by industry. The Council also is reluctant to recommend major year-over-year fluctuations in TACs in response to biomass estimates which vary significantly on an annual basis due primarily to revised formulations of the Virtual Population Analysis (VPA).

**To address this recurring problem, the FRCC commits to establishing in 2000/2001 a process designed to engage the appropriate parties in discussions with a view to developing a long-term rebuilding strategy for this stock. In the absence of such a rebuilding strategy, the FRCC is providing notice to all stakeholders that no major increases in the TAC are likely to occur in the near future. It is the view of the Council that selected TAC levels should remain stable until such time as a significant**

## SOURCES

### DFO SCIENCE

SSR A4 - 1 (2000) Northern Gulf of St. Lawrence Cod (3Pn, 4Rs)

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in:

Port-aux-Choix (March 13)

Port-aux-Basques (March 14)

Blanc Sablon (March 15)

### WRITTEN BRIEFS

Fisheries Association of Newfoundland and Labrador Limited – Alastair O'Rielly

Regroupement of Fishermen's Associations of the Lower North Shore – Paul Nadeau

Eric King Fisheries Ltd. – Roland King, John Osmond

Fish, Food and Allied Workers – David Decker

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock indicators: | stock at low level, very slow improvement |
| Overall biomass: | improved since 1994, remained stable in 1999 |
| Spawning biomass: | improved since 1994, important decrease in maturity at age in 1999 |
| Recruitment: | 1993 yearclass entered the fishery in 1999, yearclasses 1995 and 1996 are the best of the last decade, however below historical long term average |
| Growth and condition: | important improvement; back to historical highs. |
| Age structure: | still narrow, few fish older than 9 years. |
| Recent exploitation rate: | very high in 1999 (26% of ages 7 and older), according to scientific assessment; even if possibly overestimated by the analytical model (as per industry's perception), current exploitation level likely to be high. |

**increase in the stock has occurred and an increase in TAC is warranted. Should a significant decline in SSB (not related to another change in the VPA) occur in the next assessment of this stock when conducted in early 2001, the Council's recommendation for a TAC in 2001/2002 may be significantly reduced.**

The FRCC is concerned by the newly emerging gap between science and industry. This gap was reduced in recent years but the latest assessment, and the process that led to it, represents a major step back.

**Scientists must define a consistent approach in the assessment of the 3Pn4RS cod stock in order to give stakeholders a coherent view of stock biomass and trends. The fishing industry should be involved, wherever possible, in this approach.**

Further to the objective of minimising fishing on spawning concentrations during peak spawning periods.

**The FRCC recommends that DFO, in consultation with industry, identify the location and timing of major spawning concentrations of cod (e.g. St. Georges' Bay) and take effective measures (including fishing closures) to protect those spawning concentrations from fishing.**

**The FRCC recommends that the winter fishing closure (November 15 to April 15) on Burgeo Bank be continued to protect the 3Pn4RS stock components.**

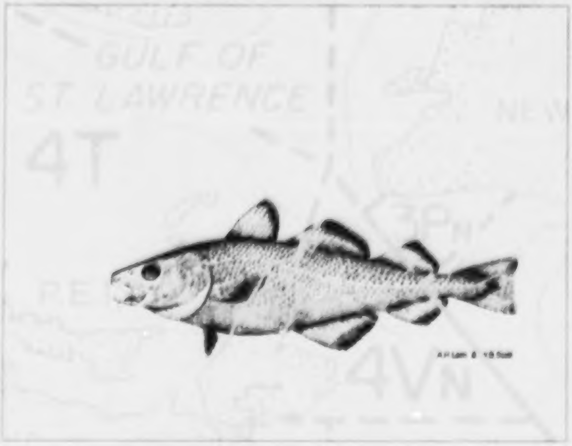
A total of 35,000 cod were tagged from which only 934 were recovered in the area: this is inconsistent with the calculated exploitation rate. Even if the tagging program was not design to assess stock biomass and exploitation levels, the small rate of tag recovery is regularly raised in the consultations.

**The FRCC recommends that studies be undertaken to clarify why the tagging program provided so little tag returns.**

Concerns were raised by the industry about the effect of increasing mesh size from 5½ inches to 6 inches in 2000. That increase was intended by the FRCC to take place in 1999 and was postponed to 2000. New information provided by scientists shows that it would increase the exploitation rate on the 1993 yearclass which the FRCC recommended to protect. The FRCC recognises those possible detrimental effects, created by the timing of the change. The Council considers, however, that the measure would have a positive impact on the poorer incoming yearclasses, allowing them to reproduce before being fully exploited. This increase will have long-term benefits.

**The FRCC recommends that the mesh size for cod be increased to 6" in 2000.**

# COD - 4TVN



## PERSPECTIVE

Cod in the southern Gulf of St. Lawrence have been exploited for over three centuries. After averaging 30,000t early in the last century, landings rose to peak at more than 100,000t in 1958. Landings remained in the 60,000t range after the mid-1960's, with a brief decline in the early 1970's. The fishery declined rapidly in the early 1990's before closing in September 1993, and was reopened for limited commercial effort in 1999.

Landings prior to 1950 were exclusively hook and line, with mobile gears and gillnets being introduced in later years. At the time of closure, mobile gears predominated, with fixed gears accounting for about 1/3 of all removals. In modern times, this fishery has supported a substantial harvesting and processing industry in communities in the southern Gulf and the Cabot Strait area where the stock overwinters.

## ANALYSIS

The most recent DFO Stock Status Report for this stock indicates that the stock continues to rebuild slowly after reaching a record low spawning stock biomass in 1994, due to the combination of low production, poor recruitment and high fishing and non-fishing mortalities. After a number of successive low years in the late 1980's and early 1990's, recruitment in subsequent years has been modestly stronger, though still below the long-term average. The Council has observed that successive recent assessments of this stock track closely from one year to the next, and notes that, for example, the results of this year's assessment are close to those predicted by the 1999 evaluation.

At recent industry consultations, the Council heard calls for TACs ranging from the status quo of 6000t to a high of 9000t. The views of the southern Gulf industry and the scientists regarding the status of the stock in 2000 appear to be more consensual than in any recent year.

In its 1999 report, the FRCC recommended an increase in the TAC to 6,000t for this stock, with the knowledge that the assessment indicated this would result in little or no growth of the stock. At that time the Council indicated that no further major changes in the TAC would be likely in the near future. The Council notes that the 2000 assessment for this stock indicates that maintaining the TAC at the current level of 6,000t should result in an increase in the spawning biomass of approximately 5% in the coming year.

The FRCC recognises that the biomass remains at a low level and that its increasing rate remains low, due to the current low productivity of the stock. The Council feels that the status quo remains acceptable, as it allows an increase in the spawning stock biomass, according to the scientific assessment, while allowing the prosecution of a commercial fishery. Considering the depressed level of the stock, and the possibility of decline, the FRCC feels that no major changes of the TAC are likely to occur in the near future.

**The FRCC recommends that the 2000/2001 TAC for 4TVn cod be maintained at 6000t.**

The Council feels that this approach, in light of the modestly improved strength in the most recent year classes, should enhance the prospects for biomass growth in coming seasons.

The Council observes that the Department of Fisheries and Oceans and the fishing industry achieved an accommodation for the 1999 winter season to curtail the traditional fishery for cod and other species while they are congregated and possibly mixed in the Cabot Strait over-wintering area. The Council believes that such restrictions are warranted while the status of these migratory stocks continues to be reduced from historic levels and particularly until the resident stock in that same area recovers from its currently collapsed condition.

**The Council recommends that any fishing on 4TVn**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 67 | 60 | 45.2 | 54 | 54 | 53 | 48 | 43 | | Moratorium | | | 2 | 3 | 6 |
| Catch | 64 | 68.7 | 54.6 | 47.9 | 42.7 | 40.2 | 31.5 | 28.3 | 4.01 | 0.9 | 0.3 | 0.4 | 1.4 | 2.5 | 5.99 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

**cod during its over-wintering in the 4Vn area should only take place to the extent that there is a high confidence that catch of 4Vn resident stock be minimal. The Department of Fisheries and Oceans is encouraged to research the conditions by which this might be achieved.**

## SOURCES

### DFO SCIENCE

SSR A3 - 1 (2000) Cod in the Southern Gulf of St. Lawrence

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in:

Gaspé (March 13)

Moncton (March 15)

Port Hawkesbury (March 16)

### WRITTEN BRIEFS

Mobilisation régionale pour l'urgence de l'emploi (MORUE)

L'association des pêcheurs de poisson de fond acadiens - Alyre Gauvin

Bay St. Lawrence Fishing Vessels Association – Hector MacKinnon

Northern Cape Breton Fishing Vessels Association – Clifford Aucoin

South Inverness Mobile Fishermen's Association – Eugene Beaton/Carl Cameron

Dale Williams, Bay St. Lawrence fisherman

Federation of Gulf Nova Scotia Groundfishermen (Fixed/Mobile <45' Competitive) – Percy Hayne

John A. Buchanan, Bay St. Lawrence Fisherman

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall indicator: | slowly improving from a very low level |
| Overall biomass: | improving slowly, but below the LTA |
| Spawning Biomass: | improving slowly, but below the LTA. |
| Recruitment: | improved since 1995, but below the LTA |
| Growth and condition: | stable at an intermediate level |
| Age Structure: | widening due to low exploitation and improved recruitment |
| Distribution: | increasingly restricted to the eastern portions of the summer range. Unknown in winter |
| Recent exploitation rate: | fishery resumed at low level in 1999 |

# AMERICAN PLAICE - 4T

## PERSPECTIVE

American plaice used to be the most abundant groundfish after cod, in the southern Gulf of St. Lawrence. The females are distinguished by a faster growth and reach larger sizes than males. They reach sexual maturity at between 7 and 15 years old while males reach maturity between 5 and 7 years old. Spawning occurs in late spring and early summer. Results based on research surveys indicate that the stock is at its lowest historical level. Total biomass estimated at 300,000t at the end of the 1970's decreased to approximately 30,000t in 1999. Age classes between 4 and 7 years are stable at a low level. Recent RV survey catches were more abundant in the eastern part of 4T. The commercial catches showed the same pattern which suggest a shift of distribution of the stock in recent years.

The landings in the 4T fishery, which is managed by quota since 1977, ranged between 5000t and 10000t until 1992. From 1993 to 1999, lower catches in the range of 1300t to 2400t did not allow for a recovery of the stock, according to the scientific assessment.

## ANALYSIS

The most recent DFO Stock Status Report describes a stock which has been in decline since 1980 and is now at its lowest level in the 1971-1999 survey period. Recruitment is stable at a low level, and the resultant yearclasses are much smaller than have been earlier observed. In addition, this stock has been increasingly concentrated in the eastern part of 4T in recent years. Scientists consider that American plaice in 4T are vulnerable to overexploitation, and suggest that catches should be well below 2000t in order to promote conservation.

The views of the fishing industry are influenced by the shifted distribution of the stock. Fishers based in the western portion of the stock area report that plaice are not as abundant as they were previously. In the eastern area, where most remaining plaice fishing occurs, fishers report that catches have maintained or even improved in recent times. The pattern of these observations correlates with the results of the survey, although fishers continue to believe that the DFO survey vessel *Alfred Needler* is inadequately equipped and operated to catch flatfish species generally, and cannot be trusted to monitor the true abundance of flatfish stocks. During recent consultations, eastern-based fishers recommended a TAC of 2500t for 2000. Western-based fishers provided no direction to Council on this stock.

Until recent times, it was widely known that poor conservation practices, notably excessive catches of small fish and significant unaccounted discards, were characteristic of the fishery on this stock, and this likely contributed to stock declines. In the last five to seven years, the mobile fleets which prosecute the bulk of this fishery have made significant strides in addressing these problems, and recent evidence indicates that the capture of small plaice in the plaice-directed fishery is no longer a serious conservation concern. In reducing the TAC to the 2,000t level and holding it in that general range since 1996, the Council has hoped to facilitate these changes and is seeking a signal that rebuilding has begun.

Considering the stock area as a whole, and the continuing good catch rates of fishers in the south-eastern Gulf notwithstanding, the Council observes that stock rebuilding has not yet been reported in this stock and that indeed overall stock abundance continues to erode slowly. The Council is aware that, on the basis of improved monitoring of catches and landings, further gear modifications to reduce small plaice by-catches and more consistent deployment of enforcement and monitoring efforts are being introduced for the coming season. The Council continues to support these efforts.

**The FRCC recommends that the 2000/2001 TAC for 4T American plaice be maintained at 2000t.**

The Council is increasingly concerned that this stock continues to decline and, in view of the observed rebuilding getting underway in Atlantic cod, wishes to forestall the potential of having comparable TACs in

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 5 | 5 | 2 | 2.5 | 1.5 | 2 |
| Catch | 10.5 | 7.7 | 8.4 | 6.8 | 4.8 | 4.4 | 5.04 | 4.9 | 1.6 | 2.4 | 2.3 | 1.4 | 1.7 | 1.1 | 1.42 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

the mixed fishery for these two species at some future point. For those reasons, the Council will have to consider another approach to the management and conservation of this stock unless rebuilding is observed in the very near future.

Addressing the diverging views of the scientists and the industry with regard to the *Needler* survey began with the Southern Gulf Survey Workshop held to assess the flat fish catchability of the *Needler*'s survey.

**The FRCC commends this approach and recommends that DFO and industry follow-up on the recommendations of the Southern Gulf Survey Workshop.**

## SOURCES

### DFO SCIENCE

SSR A3 - 36 (2000) Updates on Selected Gulf of St. Lawrence Groundfish Stocks

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in :

Moncton (March 15)

Port Hawkesbury (March 16)

### WRITTEN BRIEFS

L'association des pêcheurs de poisson de fond acadiens - Alyre Gauvin

Bay St. Lawrence Fishing Vessels Association – Hector MacKinnon

Northern Cape Breton Fishing Vessels Association – Clifford Aucoin

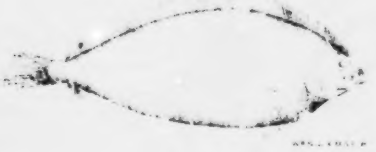
South Inverness Mobile Fishermen's Association – Eugene Beaton/Carl Cameron

Federation of Gulf Nova Scotia Groundfishermen (Fixed/Mobile <45' Competitive) – Percy Hayne

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock indicator: | the stock abundance is at its lowest level in 1999 |
| Total biomass: | after its initial decrease in early 1980's, it attains its lowest level of all historical RV surveys (1971-1999) |
| Spawning biomass: | unknown |
| Recruitment: | stable at low level |
| Growth and condition: | unknown |
| Age structure: | unknown |
| Distribution: | abundance stable at low levels concentrated on the eastern part of the distribution. Continued decline on the western portion |
| Recent exploitation rate: | 1537 t of 2000 t were landed in 1999 |

# WITCH FLOUNDER - 4RST



## PERSPECTIVE

The commercial fishery for witch flounder developed in Newfoundland in the 1940's with the introduction of the otter trawler. The fishery in the Gulf of St. Lawrence began when the stocks in Fortune Bay declined, moving the vessels into Bay St. Georges (Newfoundland) in the 1950's.

Winter catches of witch gained in importance in the offshore, as by-catch in the cod and redfish directed fisheries. The fishery further expanded in the Gulf during the 1970's to the Esquiman Channel and the Northern shore of Cape Breton Island.

Witch flounder came under quota management in 1977, with a precautionary quota of 3500t for northern Gulf of St. Lawrence (4RS). The first detailed assessment of 4RS was conducted in 1978 and continued until 1981. During the 1980's, landings in 4T increasingly dominated Gulf witch landings, however the management unit remained as 4RS. The TAC was increased to 5000t in 1979 in 4RS, to remove an old and slow growing component of the stock. This measure reduced the age composition of the stock and landings declined, and by 1982 the TAC was reduced to 3500t. Stock assessments resumed in 1991, and following the recommendations of the Fisheries Resource Conservation Council in 1994, the management unit was extended to 4RST in 1995.

## ANALYSIS

The 2000 update to the DFO Stock Status Report gives a mixed picture of the 4RST witch flounder population. The biomass appeared to increase sharply in 1999 compared to the low level from 1993 to 1998. This increase is mainly due, however, to very large catches at two sites in the Cape Breton Trough. Catch rates of witch also tended to be moderately high in parts of the Gaspé Peninsula, Laurentian Channel, St. Lawrence River and the eastern slope of the Esquiman Channel. Witch flounder were also found to be more widely dispersed throughout the relatively deep waters of the Northern Gulf but were rare on the Magdalen Shallows. Several uncertainties have to be taken into account: we do not know if the abundance observed in the Cape Breton Trough is a beginning of a trend, an anomaly, or an overflow from the Scotian Shelf population. We do not have any indication of the stock structure.

The industry view on witch flounder is marginally better. Catches are increasing and more widespread in the 4T area, and fishers report higher catch rates in Bay St. Georges (Newfoundland). This has happened while the mesh size has increased since 1995, meaning larger and fewer fish caught per year. Industry views these signs and considers that a small increase would be acceptable. Fishers also argue that several efforts have been made to improve fishing practices.

The FRCC acknowledges fishers' views and accepts the proposed modest increase. However, the recommended TAC should remain stable until such time as a significant increase in the stock has occurred and a further increase in TAC is warranted.

**The FRCC recommends that the 2000/2001 TAC for 4RST witch flounder be set at 1000t.**

On the science report on dumping and discarding, it was noted that there could be highgrading in this stock on under 14 inch fish, to keep in line with market fish size. Scientists and fishers recognise that the witch flounder fishery is mainly a recruitment fishery, which is detrimental to stock recovery. The industry appears to be ready to move to correct this situation.

**The FRCC recommends that this fishery should be monitored closely and if highgrading proves to be occurring, it should be corrected.**

**The FRCC recommends that measures be taken, such as the definition of an appropriate mesh size, to minimise the catches of immature witch flounder.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 3.5 | 3.5 | -- | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 1 | 1 | 1 | 1 | 0.8 | 0.8 |
| Catch | 0.7 | 0.8 | 0.3 | 0.16 | 1.20 | 0.7 | 0.5 | 0.4 | 0.5 | 0.1 | 0.3 | 0.5 | 0.6 | 0.89 | 0.69 |

*Catch as of Nov. 19/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## Sources

### DFO Science

SSR A3 - 36 (2000) Updates on Selected Gulf of St. Lawrence Groundfish Stocks

### FRCC Consultations

The FRCC held consultations on this stock in 2000 in :

Moncton (March 15)

Port Hawkesbury (March 16)

### Written Briefs

L'association des pêcheurs de poisson de fond acadiens - Alyre Gauvin

Bay St. Lawrence Fishing Vessels Association – Hector MacKinnon

Northern Cape Breton Fishing Vessels Association – Clifford Aucoin

Federation of Gulf Nova Scotia Groundfishermen (Fixed/Mobile <45' Competitive) – Percy Hayne

## Council's Views on Stock Status

| | |
|---|---|
| Overall indicator: | population still at low level, slightly improving, in size and in distribution. |
| Total Biomass: | stable at low level in the Western Gulf, some improvement in the East, however causes are uncertain |
| Spawning Biomass: | unknown |
| Recruitment: | stable during the 90's, but higher than in the late 80's |
| Growth and condition: | no information |
| Age structure: | no information |
| Distribution: | expending on the edge of the channels; more abundant on the north-west side of Cape Breton |
| Recent exploitation rate: | low landings due to low TAC |

# GREENLAND HALIBUT - 4RST

## PERSPECTIVE

In the Gulf of St. Lawrence, there are two main fishing areas for this stock: a western area, in the St. Lawrence estuary and the Anticosti Island area, which represents generally more than 80% of the catches, and an eastern area, in the Esquiman Channel.

The development of the fishery is recent. Long term average landings are in the range of 4000t. Very high catches, above 8000t, were experienced in the past and were followed by sharp declines. Male and female halibut have different growth rates, with females reaching maturity at a larger size. A concentration of the fishery on the larger females could have a negative impact on the stock's reproductive capacity.

## ANALYSIS

According to the most recent DFO Stock Status Report, the Greenland halibut population in the Gulf of St. Lawrence continues to show positive signs: this is the benefit of conservation measures implemented in the recent past.

The fishery is mainly prosecuted with gillnets. Conservation measures implemented recently, by regulation and by industry initiatives (i.e. mesh size, reduction of fishing effort, sorting grids in the shrimp fishery) have led to a recovery of the stock. The mean term prospect is positive as good new year classes are observed in the surveys.

The biomass index derived from the scientific survey in 1999 is the highest observed in the time series, and has been increasing steadily since 1993. Recent poor recruitment has led to a slight decline in the 1999 commercial catch rates, as well as a higher relative fishing mortality (catches *vs.* survey biomass). The situation is likely to be similar in the year 2000. Stakeholders seem to be in general agreement with the Stock Status Report, with one group advocating an increase in the TAC of 500t (*i.e.* a TAC of 5000t) for the year 2000, while another noting that in their view the stock could sustain catches as high as 6000t.

Due to the limited recruitment that will occur again in 2000, the FRCC feels that a safe approach should be not to increase the current exploitation rate in order to maintain the spawning stock biomass and to improve survival of yearclasses in the fishery. As in its 1999 Report, the FRCC notes that the current catch level is at, or close to, the long term average which means that any TAC increase should be considered with caution and, unless major changes in the stock status are noticed, the TAC should not change significantly in the near future.

**The FRCC recommends that the 2000/2001 TAC for 4RST Greenland halibut be maintained at 4500t.**

Two good year classes are seen in both the DFO Research vessel and sentinel surveys. These year classes will begin to appear in the commercial fishery in 2001 and will contribute more significantly to commercial catches in 2002. It is to be expected that, due to the strong incoming recruitment, catches of small fish will be a problem in the next years.

**The FRCC recommends that measures be implemented to limit catches of undersized Greenland halibut.**

Fishers have expressed concerns about the effect of the 6 inch (15.2 cm) mesh size which, in their views, will destroy a fair amount of large good spawners. They feel that the use of 5½ inch (14 cm) mesh should be considered for the year 2001.

The FRCC cannot accept a decrease in the mesh size, knowing that more fish (50% more according to scientists) will be killed. The Council reiterates its principle to protect young, immature fish and it feels that short-term benefits should not be allowed to overtake long-term objectives. A properly set TAC should allow sufficient mature biomass to survive fishing in order to preserve the reproductive capacity of the stock.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 5 | 5 | 8.7 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 4 | 4 | 4 | 2 | 3 | 4 | 4.5 |
| Catch | 2.3 | 6.5 | 10.9 | 7.5 | 5 | 2.3 | 2 | 3.5 | 2.5 | 3.5 | 2.4 | 1.9 | 2.6 | 3.9 | 3.2 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

The fishing of Greenland Halibut in the Cabot Strait remains a concern for fishers. The FRCC feels that a better understanding of stock migration is required.

**The FRCC recommends that studies on stock definition, through tagging programs and other scientific work, be continued and expanded.**

## SOURCES

### DFO SCIENCE

SSR A4 - 03 (2000) Gulf of St. Lawrence (4RST) Greenland Halibut

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in :

Gaspé (March 13)

Moncton (March 15)

Blanc Sablon (March 15)

### WRITTEN BRIEFS

L'association des pêcheurs de poisson de fond acadiens - Alyre Gauvin

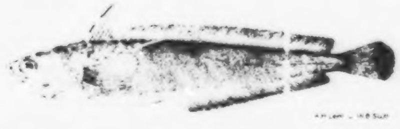
Association Québécoise de l'industrie de la pêche – Jean-Paul Gagné

Regroupement of Fishermen's Associations of the Lower North Shore – Paul Nadeau

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock indicator: | stock still rebuilding |
| Overall biomass: | consistently increasing since 1993 |
| Spawning Biomass: | unknown |
| Recruitment: | 1997 and possibly 1998 year classes above average. |
| Age structure: | improving |
| Recent exploitation rate: | relative fishing mortality increased in 1999 due to poor recruitment |
| Geographical distribution: | xxpanding south of Anticosti Island. |

# WHITE HAKE - 4T



## PERSPECTIVE

The white hake fishery has been conducted in the southern Gulf of St. Lawrence since the early 1960's. Traditionally, this stock has been harvested with both mobile and fixed gear primarily in the inshore fishery. Although this fishery did not rate as the most important groundfish fishery, with the exception of several localised areas, it nevertheless played a vital role in the historical landings and revenues of the inshore fleet. Annual landings in this southern Gulf groundfish fishery have averaged 5675t from the early 1960's to 1994.

Catch rates continued to decline in the early 1990's until the fishery closed in 1995. The overall range and distribution of this stock remains concentrated in St. George's Bay. Limited removals have continued since the moratorium for the purposes of sentinel surveys and by-catch for other fisheries.

## ANALYSIS

Although the abundance of commercial-sized fish remains low, there are very good indications of 20-35cm hake that should recruit to the fishery over the next two years. Continued efforts of industry (i.e., mesh size increases and other conservation measures) should ensure a continued rebuilding of this stock to previous historic levels.

The general consensus is that the stock remains very low and in a precarious state. The outlook for the future is better as new year classes are observed and should be protected.

The FRCC reiterates its previous recommendations for this stock:

**The FRCC recommends that there be no directed fishery for 4T white hake in 2000/2001.**

**The FRCC recommends that there be a restrictive by-catch fishery only and that measures be implemented to minimise by-catches of this stock in all fisheries directed towards other species. In addition, consideration should be given by DFO, in consultation with industry, to the establishment of incremental conservation measures, including closed areas where higher by-catches are encountered, closed seasons when higher by-catches are encountered.**

**The FRCC recommends that the substantive by-catch in other fisheries occurring in St. George's Bay (Nova Scotia), which may result in significant white hake mortality, be avoided.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 12 | 12 | 9.4 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 3.6 | 2 | Moratorium | | | | |
| Catch | 6.7 | 4.9 | 5.9 | 3.7 | 4.9 | 4.2 | 3.7 | 3.9 | 1.2 | 0.9 | 0.06 | 0.04 | 0.1 | 0.13 | 0.11 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## SOURCES

### DFO SCIENCE

SSR A3 - 36 (2000) Updates on Selected Gulf of St. Lawrence Groundfish Stocks

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in :

Moncton (March 15)

Port Hawkesbury (March 16)

### WRITTEN BRIEFS

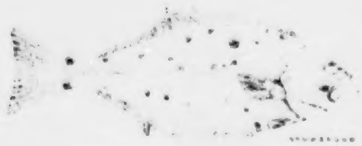
Federation of Gulf Nova Scotia Groundfishermen (Fixed/Mobile <45' Competitive) – Percy Hayne

Gulf Nova Scotia Fleet Planning Board – Percy Hayne

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock indicator: | stock abundance remains lower than the long term average. Future prospect looks better due to incoming recruitment |
| Total biomass: | lower than the long term average, however biomass index is the highest since 1992 |
| Spawning biomass: | unknown |
| Recruitment: | abundance of small fish is increasing |
| Growth and condition: | no information |
| Age structure: | fish larger than 40cm less abundant than long term average; increasing abundance of fish in the 20-35cm range |
| Distribution: | still mainly concentrated in Western Cape Breton area (St. George's Bay) |

# ATLANTIC HALIBUT - 4RST



## PERSPECTIVE

The Atlantic halibut is widely distributed in the deep channels of the Gulf of St. Lawrence. It is thought that it overwinters outside the Gulf, in the 3Pn and 4Vn areas.

The fishery is generally prosecuted with long lines. Over the past 20 years, the average landings are in the range of 300-400t with peaks as high as 800t. Historical data indicate that catches may have been above 1000t.

## ANALYSIS

The implementation of a minimum legal size and the mandatory release of undersized halibut has translated into a significant decrease in the landings of small fish. The wide size range of fish caught is a positive sign of stock health. However, questions about the actual size at maturity for females, which might be much higher than the present minimum legal size, raise the issue of stock reproductive capacity under the current management regime.

According to the most recent DFO Stock Status Report, the current situation is the same as it was in 1999: wide size ranges and decreasing catches of small fish, which both can be interpreted as positive signs. No reliable biomass index is available. Despite the fact that catches are capped by a TAC, it seems clear that the actual potential catches are lower than historical catches (which were in the range of 1000t) and would indicate that the stock continues to be depressed from historical levels. The fishing industry seems to agree with the stock status described by scientists.

**The FRCC recommends that the 2000/2001 TAC for 4RST Atlantic halibut be maintained at 350t.**

**The FRCC recommends that the release of fish smaller than 81cm be maintained, and enforced.**

The minimum legal size is an issue raised by scientists. The present size of 81cm may be well below the size at maturity for females, which could be above 100cm. If a size of 100 cm at maturity is confirmed, the current regulation does not protect the stock's reproductive capacity.

**The FRCC recommends, as a scientific priority, that studies be undertaken to determine the size at maturity of Atlantic halibut.**

Stock unit and possible mixing with stocks outside the Gulf remains an issue.

**The FRCC recommends that the Atlantic halibut tagging program be continued and expanded.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | -- | -- | -- | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.45 |
| Catch | 0.19 | 0.27 | 0.27 | 0.19 | 0.22 | 0.42 | 0.34 | 0.14 | 0.11 | 0.12 | 0.07 | 0.23 | 0.28 | 0.3 | 0.26 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## SOURCES

### DFO SCIENCE

SSR A4 - 02 (1999) Atlantic halibut of the Gulf of St. Lawrence (4RST)

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in :

Port Hawkesbury (March 16)

### WRITTEN BRIEFS

Dale Williams, Bay St. Lawrence fisherman

Federation of Gulf Nova Scotia Groundfishermen (Fixed/Mobile <45' Competitive) – Percy Hayne

John A. Buchanan, Bay St. Lawrence fisherman

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock indicators: | stock at low level |
| Overall biomass: | unknown but likely to be at low level |
| Spawning biomass: | unknown |
| Recruitment: | unknown |
| Growth and condition: | not available |
| Age structure: | no reliable indicator, wide size range present |
| Recent exploitation rate: | TAC increased to 350 t in 1999. By-catch of small fish in mobile and gillnet fisheries is still a concern |

# WINTER FLOUNDER - 4T

## PERSPECTIVE

In the southern Gulf of St. Lawrence (4T), winter flounder are limited to the Magdalen Islands and to southern parts of 4T. Growth rates vary widely between regions, with females reaching sexual maturity at about 25 cm and with males maturing at about 20 cm. The historical landings in the 4T winter flounder fishery varied widely between a few tons and 4500t. Those large fluctuations may be partially due to misreporting or to landings of "unspecified" flatfishes. Lower landings could have also been affected by the use of larger mesh sizes, which have increased considerably since 1960. The catches were limited by a precautionary TAC of 1000t since 1996. Landings declined sharply after 1997.

## ANALYSIS

The updated DFO Stock Status Report for 4T winter flounder confirms trends observed in the past years. Biomass indexes are declining, being now at their lowest level. Winter flounder has a tendency to be smaller in size and weight since 1971. Trends in survey biomass suggest that the stock for the whole of 4T, is presently below the average abundance for the past three decades. These are warning signals. Uncertainties exist however. The survey only covers a small part of the overall distribution of the species and is recognised not to assess the recruitment effectively. The stock is certainly made up of several components.

Little discussion occurred on the state of the stock during consultations. The scientific view contrasts with the active fishers, who in interviews over the past five years say that the abundance of the resource is increasing. Considering the limited extent of scientific knowledge on the dynamics of this stock, they recommend *status quo* on the 2000 TAC.

**The FRCC recommends that the 2000/2001 TAC for 4T winter flounder be maintained at 1000t.**

The last winter flounder assessment indicated that the data used to evaluate local abundance, recruitment and stock identification should be improved. Initiatives were put in place in recent years (industry survey on Magdalen Island, logbooks in the southern Gulf and tagging study) to help improve the data in order to determine whether local management measures would be applicable.

**The FRCC recommends that the tagging program be continued in order to provide a more realistic view of the state of the stock and its migration.**

Dumping and discarding of primarily undersized American plaice, as well as winter flounder, remains a major concern and must be resolved.

**The FRCC recommends that the mesh size should be increased appropriately and consistently for each area and for both gillnet and mobile gear vessels, and that steps be taken to ensure that all fishing mortality is reported.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | | 1 | 1 | 1 | 1.2 |
| Catch | 1.2 | 2 | 1.8 | 1.4 | 2.1 | 2.1 | 2.5 | 1.9 | 1.2 | 0 | 0 | 0 | 1.08 | 0.59 | 0.56 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## SOURCES

### DFO SCIENCE

SSR A3 - 36 (2000) Updates on Selected Gulf of St. Lawrence Groundfish Stocks

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in :

Moncton (March 15)

Port Hawkesbury (March 16)

### WRITTEN BRIEFS

Federation of Gulf Nova Scotia Groundfishermen (Fixed/Mobile <45' Competitive) – Percy Hayne

L'association des pêcheurs de poisson de fond acadiens - Alyre Gauvin

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall stock indicator: | the stock abundance lower than the long term average. |
| Total biomass: | lower than the long term average. |
| Spawning biomass: | unknown |
| Recruitment: | unknown |
| Growth and condition: | mean size and weight at lowest historical levels. |
| Age structure: | unknown |
| Distribution: | there is probably several local components of this stock. |

# YELLOWTAIL FLOUNDER - 4T

W.B. Scott & M.G. Scott

## PERSPECTIVE

Yellowtail flounder in the Gulf of St. Lawrence are primarily concentrated around the Magdalen Islands where they have supported a bait fishery for the local lobster fishery. Other than the localised fishery around the Magdalen Islands, yellowtail flounder is harvested as a by-catch in other fisheries. The Magdalen Island fishery is mainly carried out using mobile gear.

A one-time overseas market developed during 1997 resulted in over 800t being harvested. Quotas were established for this stock in 1998 for the first time at a level of 300t. Due to poor markets and an establishment of a quota, harvesting effort has been dramatically reduced since 1998. A localised bait fishery continues to be prosecuted.

## ANALYSIS

The FRCC considers that the outlook of the stock has not changed since its 1999 report and that there are no reasons to modify its precedent recommendations.

**The FRCC recommends that a 2000/2001 quota of 300t be maintained for 4T yellowtail flounder in the Magdalen Islands area.**

**The FRCC recommends that in other areas, catches should not exceed those required for the normal conduct of fisheries directed toward other species.**

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | | | | | | | | | | | 0.43 | 0.43 | 0.8 | 0.3 | 0.375 |
| Catch | | | | | 0 | 0 | 0 | 0.12 | 0.12 | 0.06 | 0.2 | 0.21 | 0.8 | 0.19 | 0.29 |

*Catch as of Dec. 23/99

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

## SOURCES

### DFO SCIENCE

SSR A3 - 36 (2000) Updates on Selected Gulf of St. Lawrence Groundfish Stocks

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in 2000 in:

Moncton (March 15)

Port Hawkesbury (March 16)

### WRITTEN BRIEFS

L'association des pêcheurs de poisson de fond acadiens - Alyre Gauvin

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall indicator: | population stable; slight improvement in 1999 |
| Total Biomass: | biomass index increased in the past 3 years |
| Spawning Biomass: | unknown |
| Recruitment: | the decrease in the modal size in the survey may indicate some recruitment |
| Growth and condition: | no information |
| Age structure: | decrease in the abundance of large fish |
| Distribution: | fish localised around Magdalen Islands and along Prince Edward Island; the existence of subcomponents is debated |
| Recent exploitation rate: | low landings due to low TAC |

# CHAPTER 4: GEORGES BANK GROUNDFISH STOCKS AND 2J3KL COD

# LETTER TO THE MINISTER

May 24, 2000

The Honourable Herb Dhaliwal, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister,

The Fisheries Resource Conservation Council (FRCC) herewith presents to you its report on 2000/2001 Conservation Requirements for Georges Bank Groundfish Stocks and 2J3KL Cod.

Your Council's advice is to increase cautiously total removals for the Georges Bank haddock and yellowtail flounder stocks. This positive advice for the fishery is tempered by recommendations to decrease total removals of Georges Bank cod and to decrease the catch of northern cod.

During our April consultations in Newfoundland, the Council heard overwhelmingly from the 800 fishermen in attendance about the impact which seals are having on the recovery of the northern cod stock. The Council agrees with fishermen that predation by seals is negatively impacting the stock, and has provided advice on the management of seal predation which builds on our 1999 advice on seals. Fishermen also report that cod on the shelf are not living beyond five years, and scientists cannot specify the cause.

The Council is heartened by the increased information available to it partly as a result of the coastal fishery conducted in 3K and 3L last year. This information is a vital part of our understanding of the state of the northern cod stock. Indeed, our advice for 2000 underlines the need to gather information through a continued sentinel fishery in coastal 2J3KL, and an index fishery in coastal 3K and 3L. Only fisheries that contribute to this information gathering should be pursued for this stock.

On Georges Bank, the haddock and yellowtail stocks are recovering from the lows of the 1990's. The Council has continued to use the conservation objectives it has set out in the past for these stocks in order to provide its advice to you for 2000. However, the Council was not able to achieve its objectives in the Georges Bank cod stock. The Council has provided advice on this stock which allows the mixed cod/haddock fishery to continue: such a fishery will prolong the recovery of the cod stock, and the Council accepts this as a reasonable compromise in the short term. The increasing strength of the haddock stock will complicate this situation, and reasonable measures must be implemented to avoid cod in the directed haddock fishery.

The Council's advice on Georges Bank yellowtail flounder and haddock is for catch levels lower than those recommended by industry during our consultations in early May. For yellowtail flounder, the recommended catch level reflects the strong presence in the population of a single year class which makes up 43% of the total biomass. For haddock, the recommended catch level reflects that the stock still remains below biomass levels of the 1930's to the 1950's, and the Council's belief that the higher catch levels recommended by industry would not be prudent given the uncertainties surrounding this stock that continues to rebuild.

As we indicated in our report on Gulf of St. Lawrence stocks, over the next year, the Council will undertake discussions with stakeholders in the fishing industry, with scientists and fisheries managers within your Department to continue the development of strategies, objectives and indicators for the stocks within the FRCC's mandate.

Sincerely,

Fred Woodman
Chairman

# INTRODUCTION

The following discussion and recommendations apply to all three groundfish stocks on Georges Bank, 5Zjm cod, 5Zjm haddock, and 5Zjmnh yellowtail flounder.

Due to discrepancies between the results of the Stock Status Reports and industry observations, especially for cod, industry questioned the effectiveness of the DFO research surveys in their ability to catch juvenile fish and the overall catchability of cod and yellowtail flounder. Industry also questioned the survey design and selection of strata for yellowtail flounder and expressed a lack of confidence in the research vessel surveys in general.

It was noted that a workshop between industry and government on survey methodology would be beneficial to both sides with a view to improving understanding of their design and impact on stock assessment.

**The FRCC recommends that DFO Science convene with industry a workshop on survey methodology for Georges Bank stocks to be held in 2000-2001. This workshop should:**

- **i. examine opportunities for improved understanding of the research vessel gear deployment, catchability and survey design; and**
- **ii. address and explore the effectiveness of implementing in the 2000 fishery additional joint DFO-industry research activity to assist in stock assessment.**

Once again in 2000, in order to mitigate potential by-catch problems in the mixed cod and haddock fisheries, industry requested an opening date of June lst for this fishery.

**The FRCC recommends that the fishery for Georges Bank commence on June 1st, 2000.**

The FRCC is pleased to note that discussions are continuing with the United States on Georges Bank stocks. Industry representatives noted the need for a harmonized management of the Georges Bank stocks by Canada and the U.S.

**The FRCC reiterates its previous recommendation that Canada and the United States continue discussion with the objective of ensuring continued stock rebuilding by adopting consistent management and conservation measures on both sides of the Hague Line.**

The FRCC has endorsed the need for longer-term planning for conservation of Altantic groundfish stocks within an ecosystem and precautionary framework. In 2000, the Council plans to engage industry and the Department in consultations towards the development of these longer-term conservation plans for Georges Bank groundfish stocks. Pending the adoption of such plans, the Council has constructed its recommendations for 2000 within the context of previously identified stock specific criteria.

## PREVIOUS RECOMMENDATIONS

The FRCC feels it is not necessary to reiterate every recommendation made in past reports. Unless clearly stated otherwise, those recommendations are still valid.

## GEORGES BANK QUESTIONNAIRE TO STAKEHOLDERS

The Georges Bank questionnaire to participants in the 1999 fishery asked fishermen about their observations and their views on stock status. Respondents represented about 15% of total vessel operators in the Georges Bank fishery in 1999 with information from fishermen in the fixed gear <45' sector, the mobile gear <65' ITQ fleet, and from the over 100' vessels sector. The majority of respondents (from the <45'fixed gear sector) fished between the opening of the fishery in June and September. Mobile gear fishermen fished in all months from June to December. Nearly 90% of respondents reported that they had more than 10 years of experience in fishing on Georges Bank.

Fishermen reported that they experienced better catch rates in 1999 for all three stocks. They also noted that all groundfish stocks were easy to find, although longline fishermen in particular commented that regulations prevented them from catching available fish, especially cod. Nearly all respondents noted the effectiveness of the Georges Bank monitoring program including 100% dockside monitoring, at-sea boarding, and observer coverage. A majority of respondents to the questionnaire noted that the water temperature had been warmer on Georges Bank in 1999 and that predators and prey were evident in 1999 to the same extent or more than that observed in 1998. Fishermen also reported more small cod, and more large haddock and yellowtail flounder were present on Georges Bank in 1999.

# ENVIRONMENTAL OVERVIEW FOR GEORGES BANK

The known physical and biological attributes are generally positive. Measured temperature conditions were above the long-term mean. Overall predator-prey conditions for groundfish seem to be reasonably favourable. Prey for haddock and yellowtail flounder include worms, nematodes, and brittle stars. While the abundance of these species is not measured, the growth and condition of haddock and yellowtail flounder as well as their improving abundance indicate favourable feed conditions. Prey for cod, e.g., herring, is abundant and the availability of sandlance appears to be improving. Fishermen also observe that the strong presence of whales and seabirds on the northern edge of the Bank indicate favourable feed conditions. The relative abundance of major predator species for groundfish in the area (dogfish, shark, and cod) is moderate and variable. In light of the cod recruitment problem, the Council raises the question of whether there may be a linkage between the increasing abundance of pelagics on Georges Bank and the survivability of cod egg and larvae.

# COD - 5ZJ,M

A.H. Leim & W.B. Scott

## PERSPECTIVE

Fishermen have fished Georges Bank cod since the late 1700s. However, only Canada and the United States of America have had directed fisheries on this stock since 1977. On Georges Bank, cod and haddock are transboundary and are caught together in a mixed groundfish fishery predominantly by longline gear. However, the catchabilities of cod and haddock differ and they are not necessarily caught in proportion to their relative abundance.

In the post 1977 period, combined USA and Canada catches peaked at 26,000t in 1982 and declined to their lowest level of 1,800t in 1995 when fishing was restricted to by-catch only. Since 1996 total landings have averaged about 3,000t with Canada accounting for more than two-thirds of landings.

Management of the Canadian fishery has included seasonal closures to all gear sectors from January 1 to May 31 since 1994. Vessels >65' operate under enterprise allocations, mobile gear <65' under ITQs, and fixed gear under individual or community quotas. The U.S. fishery has been constrained by specified area year-round closures since 1995.

In the most recent years, the growth of the Georges Bank cod stock has been hindered by poor recruitment despite low rates of exploitation.

## INTERIM STOCK OBJECTIVES

In past reports, the Council had the following interim objectives for this stock:

- total removals based on exploitation below $F_{0.1}$;
- 25,000t interim threshold for spawning stock biomass (ages 3+) to improve the chances of good recruitment;
- an expected annual increase in cod biomass of 5 percent or greater;
- a probability of decline in cod biomass on the order of 20 percent or less; and
- continue to guard against the potential for dumping and discarding in the mixed haddock/cod fishery.

## ANALYSIS

Although the exploitation rate in 1999 was below $F_{0.1}$, the stock experienced a decrease in spawning stock biomass in 2000. This stock is at approximately 18,000t of spawning stock biomass in 2000, a decrease of approximately 500t since 1999, but above the lowest estimated level of about 7500t in 1995. A combination of poor recruitment and higher than expected catches resulted in this stock not achieving the 5% expected growth projected last year.

Consultations on 5Zjm cod were held in Yarmouth on May 9, 2000. Generally fishermen expressed the view that the cod stock does not seem to be in as much difficulty as is portrayed in the Stock Status Report (SSR). Fishermen report continued good catch rates in the directed cod fishery and significant cod by-catch in directed haddock trips. Despite efforts to avoid traditional areas of high cod concentrations, fishermen report that catch rates of cod continue to be high.

The Council continues to be very concerned with the lack of recruitment experienced in this stock. The SSR notes that the 1997 and 1998 recruiting year-classes are the lowest observed in the series as one year olds. In addition, recruitment has been below the 1978 to 1998 average since the 1990 year-class. Production from the stock is coming almost entirely from somatic (body) growth rather than recruitment.

Fishermen on the other hand, feel strongly that research vessel surveys do an inadequate job of catching juvenile fish. The exceptional catch rates of recent years by fishermen causes them to conclude that recruitment is higher. In recent stock assessments there has been a tendency to underestimate age 1 and age 2 cod. For example, the 1996 year-class has been upgraded each year for the past two years. The FRCC recognizes that uncertainty exists regarding the inher-

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC [2] | -- | -- | -- | -- | 8 | -- | 15 | 15 | 15 | 6 | 1 | 2 | 3 | 1.9 | 1.8 |
| Catch | 17.1 | 14.1 | 16.6 | 20.6 | 14.4 | 20.7 | 20.2 | 16.8 | 12.5 | 5 | 1 | 1.9 | 2.9 | 1.9 | 1.65 |

* Canadian catch as of April 19/00

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

2. Canadian TAC

Catches from 1994 - 1999 are Canadian only

ent differences in catchabilities of cod and haddock by different gear types in the mixed fishery.

Since 1995, conservation and management measures have facilitated the estimated increase in biomass from 7500t to over 18,000t. It is apparent that the FRCC's objective of continued growth will not be realized in 2000. However, the Council believes that catches should be permitted to allow a limited mixed cod/haddock fishery to take place and ensure that important stock information will be maintained which will facilitate the continued assessment of this stock. The Council recognizes that such action will prolong the period of recovery for the cod stock and accepts this as a reasonable compromise in the short term. The stock status will have to be monitored closely until recruitment is substantial enough to contribute to the spawning stock biomass.

In view of this approach, the Council believes that a reduction in the actual total removals from 3000t in 1999 to a recommended level of 2000t in 2000 will not unduly compromise the stock. At this yield for 2000, the expected change in the age 3+ biomass as estimated by scientists is a 2% reduction, at a fully recruited exploitation rate of 8% or about one-half the equivalent $F_{0.1}$ exploitation.

**The FRCC recommends that the total removals of 5Zjm cod for 2000 be set at 2,000t (combined Canadian/US total removals).**

## SOURCES

### DFO SCIENCE

Eastern Georges Bank Cod. DFO Science SSR A3-04 (2000). 6p.

### FRCC CONSULTATIONS

The FRCC held consultations on this stock at Yarmouth on May 9, 2000 at the Grand Hotel.

### WRITTEN BRIEFS

Inshore Fisheries Limited – Claude d'Entremont

Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux

Scotia Fundy Inshore Fishermen's Association – Evan Walters

The <45' Shelburne County Fixed Gear Quota Group – Weldon Smith

Pubnico Ledge Fisheries - Frank d'Entremont

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | stock above minimum but not growing, poor successive recruitment observations are causes for concern |
| Spawning Biomass: | decreasing and below the 25,000t minimum threshold |
| Total Biomass: | below long term average |
| Recruitment: | recovery since 1994 due to moderate year-classes in 1992 and 1995; 1997 and 1998 year-classes lowest observed |
| Growth and Condition: | weights-at-age remain below long-term average |
| Age Structure: | landings dominated by 1996 year-class at age 3 |
| Distribution: | consistent over time |
| Recent Exploitation Level: | below $F_{0.1}$ since 1998. |

The Council recognizes that management of the mixed fishery for cod and haddock poses special challenges for managers and industry. As the 5Zjm haddock stock on Georges Bank continues to increase, industry and DFO should investigate and implement every reasonable measure to improve the ability of industry to avoid or minimize the catch of cod during a directed haddock fishery.

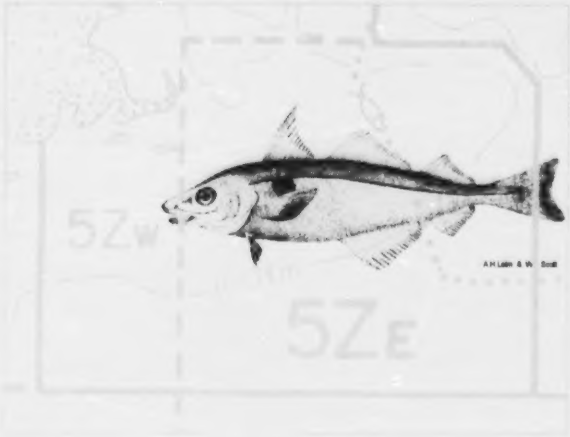
**The FRCC recommends a continuation of the 100% dockside monitoring program and increases in at-sea enforcement to prevent dumping and discarding. Timely area and/or fleet closures should be implemented as necessary.**

**The FRCC also recommends expanded use of horizontal separator panels on all otter trawls in the directed haddock fishery to reduce the catches of cod; and continued use of management/industry subareas for refined management control throughout the fishery.**

The FRCC notes that by the end of the 2000 fishing season, the industry/DFO Georges Bank longline survey will provide five years of additional information on stock status. The FRCC supports this joint initiative and anticipates the formal inclusion of the survey into future stock assessments.

**The FRCC recommends that the industry/DFO Georges Bank longline survey continue to be carried out under consistent protocol so that it can be used as an index of abundance for future stock assessments beginning in 2001.**

# HADDOCK - 5ZJ,M



## PERSPECTIVE

The haddock, a bottom dwelling species in the gadoid family, is found on both sides of the North Atlantic. In the western Atlantic, haddock range from Greenland to Cape Hatteras, with a major concentration on Eastern Georges Bank. On Georges Bank, young haddock grow rapidly at first, reaching over 50 centimeters (20 inches) by age 3, but grow slowly after, reaching about 75 centimeters (30 inches) by age 10. Many haddock mature by age 2 but it is uncertain if these young fish successfully produce viable eggs and larvae.

Georges Bank haddock have supported a commercial fishery since prior to 1900. Bottom trawlers have been the principal gear since their introduction in the 1920's. Landings from Georges Bank, which include the eastern Georges Bank component and the Great South Channel component, averaged about 46,000t between 1935 and 1960 and increased to over 100,000t in the 1960's under heavy exploitation. Subsequently, during the early 1970's, spawning season/area closures were introduced as a means of controlling effort and are still in use today. Following the extension of jurisdiction to 200 miles by coastal states in 1977, only Canada and the USA have fished this stock. Both Canada and the USA impose minimum fish size regulations. On Georges Bank, cod and haddock are transboundary and are caught together in a mixed groundfish fishery predominantly by mobile gear.

The fishery is closed to all sectors from January 1 to May 31 since 1994. Canadian landings have ranged from about 2000t increasing to 3600t from 1995 to 1999.

## INTERIM STOCK OBJECTIVES

Pending consultation with industry on a long-term strategy for this stock as noted in the introduction, as in past reports, the Council set the following objectives:

- total removals based on exploitation below $F_{0.1}$;
- 40,000t interim threshold for spawning stock biomass (ages 3+) to improve the chances of good recruitment;
- an expected annual increase in biomass of 5 percent or more; and,
- a probability of decline in biomass (from the risk analysis) in the order of 20 percent or less.

## ANALYSIS

Stakeholders expressed satisfaction with the continued rebuilding that took place over the past year. Industry recommendations for total removals were at the $F_{0.1}$ level of 8,800t and below. Industry advised that the FRCC make recommendations on total removals without taking into consideration management issues related to species mix in the cod, haddock, and yellowtail flounder fisheries on Georges Bank.

The stock is quickly approaching the 40,000t interim threshold in spawning stock biomass (ages 3+) which may be reached by 2001-2002. The Council recognizes the improvements made in this stock as a result of the conservation measures adopted by industry in recent years and encourages a continuation of these initiatives.

In 1999, the exploitation rate on fully recruited biomass was 12%, well below the equivalent $F_{0.1}$ exploitation rate of 20%. The spawning stock biomass increased by 20% from 1999 to 2000 due principally to the 1992 and 1996 year-classes but also supported by the 1991 and 1993 year-classes. The continued biomass increase is expected to be supported by the incoming 1998 year-class. The outlook for haddock on Georges Bank continues to be good and the population is responding positively to the low exploitation regimes in recent years.

While the biomass has increased since 1993, it remains below the long-term historical average dating from 1930s to 1950s. There is uncertainty about year-class abundance in the forecast results. There is also uncertainty due to variations in weights-at-age, partial recruitment to the fishery, and natural mortality. While

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC [2] | -- | -- | -- | -- | 8.2 | -- | 5 | 5 | 5 | 3 | 2.5 | 4.5 | 3.2 | 3.9 | 3.9 |
| Catch | 5.2 | 5.6 | 6.1 | 5.7 | 4.1 | 4.5 | 6.4 | 5.6 | 4.1 | 2.4 | 2 | 3.4 | 2.8 | 3.4 | 3.68 |

* Canadian catch as of April 19/00

1 Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

2 Canadian TAC

Catches from 1994 - 1999 are Canadian only

conditions have improved. further stock rebuilding is required.

In light of these uncertainties. Council has difficulties with year-over-year recommendations that would double total removals from this stock and believes it is prudent to take a more measured approach.

Total removals for the entire stock area (5Zjm) of 6,000t is about 70% of the $F_{0.1}$ level of 8,800t. This level of catch will keep exploitation below $F_{0.1}$ and it is expected that this will increase the spawning stock biomass by more than 30%.

**The FRCC recommends that the total removals of 5Zjm haddock for 2000 be set at 6,000t (combined Canadian/US total removals).**

## SOURCES

### DFO SCIENCE

SSR A3-08 (2000) Haddock on Georges Bank.

### FRCC CONSULTATIONS

The FRCC held consultations on this stock at Yarmouth on May 9, 2000 at the Grand Hotel.

### WRITTEN BRIEFS

Inshore Fisheries Limited – Claude d'Entremont

Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux

Scotia Fundy Inshore Fishermen's Association – Evan Walters

The <45' Shelburne County Fixed Gear Quota Group – Weldon Smith

Pubnico Ledge Fisheries - Frank d'Entremont

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | recovering |
| Spawning Biomass: | near 40,000t threshold |
| Total Biomass: | increasing since 1993 but remains below long term average level |
| Recruitment: | sporadic; 1992 and 1996 year-classes moderate while 1997 was weaker; the 1998 year-class appears to be strong and the preliminary information on the 1999 year-class indicates that it is moderate |
| Growth and Condition: | average growth; age 1 survivorship is generally higher than observed during the 1980's |
| Age Structure: | broad age structure is reflected in both the fishery and the catch |
| Distribution: | similar to recent past |
| Recent Exploitation Level: | below $F_{0.1}$ since 1995 |

# YELLOWTAIL FLOUNDER - 5ZJMHN

## PERSPECTIVE

Yellowtail flounder populations range from Labrador to Chesapeake Bay and are considered relatively sedentary. A major concentration of yellowtail flounder occurs on Georges Bank to the east of the Great South Channel. While tagging work indicates limited movement from Georges Bank to adjacent areas, knowledge of seasonal movement of yellowtail flounder on Georges Bank is poor.

On Georges Bank, spawning occurs during the late spring period peaking in May. It appears that spawning occurs on both sides of the international boundary. Yellowtail flounder appear to have variable maturity schedules, with age two females considered 40% mature during periods of high stock biomass to 90% mature during periods of low stock biomass.

Total catches of Georges Bank yellowtail flounder reached almost 20,000t in the late 1960s. The Canadian directed fishery for yellowtail flounder is a relatively recent development, with significant catches first occurring after the introduction of specialized gear in 1993. In 1994, with about 40 vessels pursuing the Canadian fishery there was a catch of 2,142t. Under quota control for the first time in 1995, Canadian catches were 495t against a quota of 400t. The combined Canada-USA catch has been increasing since 1995, and in 1999 was 4,441t with Canada taking 1,971t of its 2,000t quota.

The Canadian fishery is mainly pursued using otter trawl gear from vessels less than 65'. The fishery occurs in a relatively limited portion of Georges Bank known as the Yellowtail Hole (5Zm), and with current management restrictions, operates in the latter half of the calendar year only. Both Canada and USA employ the same management unit.

## INTERIM STOCK OBJECTIVES

Pending consultation with industry on a long-term strategy for this stock as noted in the introduction, as in past reports, the Council set the following objectives:

- total removals based on exploitation below $F_{0.1}$;
- an expected annual increase in spawning stock biomass of 5 percent or more; and
- a probability of decline in biomass (from the risk analysis) on the order of 20 percent or less.

## ANALYSIS

In 1999, the exploitation rate on fully recruited biomass was 12%, well below the equivalent $F_{0.1}$ exploitation rate of 20%. The spawning stock biomass virtually doubled in part due to the increased estimate of the very large 1997 year-class in 2000. The outlook for yellowtail flounder on Georges Bank continues to be good and the population is responding positively to the low exploitation regimes.

Mobile gear reported increasing catch rates in this fishery, despite using traditional groundfish gear as opposed to gear specially designed to catch flatfish. Industry also noted an increasing spatial distribution of the resource which was considered a positive sign.

Industry advised that the FRCC make recommendations on total removals without taking into consideration management issues related to species mix in the cod, haddock, and yellowtail flounder fisheries on Georges Bank. Total removals recommendations ranged from 7,800t to 8,000t at $F_{0.1}$.

The phenomenal rate of increase observed this year is not expected to continue in the future. Recent recruitment is strong relative to the 1980s, and the 1997 year-class appears to be the strongest since 1973. The 1997 year-class is expected to contribute 42% to the exploitation in the 2000 fishery and 43% of the total biomass.

The FRCC is concerned about the few older age groups in the population. A consequence of the large 1997 year-class is an opportunity to expand the age structure in the population by increasing the percentage of older fish in the population.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.43 | 0.43 | 0.8 | 1.2 | 2 |
| Catch | -- | -- | -- | -- | -- | -- | -- | -- | 0.2 | 1 | 0.48 | 0.4 | 0.79 | 1.14 | 1.96 |

* Canadian catch as of April 19/00

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

Total removals of 6,000t in 2000 would result in a negligible probability that the biomass will decline in 2001, and are consistent with the FRCC's objectives for stock growth. This catch level allows expected growth in biomass of 15% and an exploitation rate of 15%, below the equivalent $F_{0.1}$ exploitation rate of 20%.

**The FRCC recommends that the total removals of 5Zjmnh yellowtail flounder for 2000 be set at 6,000t (combined Canadian/US total removals).**

The FRCC noted that continued low levels of sampling and absence of age information have compromised reliability of the stock assessment results. The FRCC is pleased to note that DFO Science intends to improve aging capability to deal with this deficiency.

**The FRCC recommends that increased yellowtail flounder sampling work be conducted to improve the reliability of stock assessment results.**

In last year's report, the Council noted the potential impact of the Canadian scallop fishery on yellowtail flounder. Information on this by-catch was not tabled at the TRAC meeting for the Canadian scallop fleet. DFO subsequently informed the Council that their preliminary investigation indicates that this problem is negligible.

**In order to ensure the conservation of this resource, the FRCC recommends that information on yellowtail flounder catches and/or discards in the Canadian scallop fishery be tabled and incorporated in the next stock assessment.**

## SOURCES

### DFO SCIENCE

SSR A3-15 (2000) Yellowtail flounder on Georges Bank.

### FRCC CONSULTATIONS

The FRCC held consultations on this stock at Yarmouth on May 9, 2000 at the Grand Hotel.

### WRITTEN BRIEFS

Inshore Fisheries Limited – Claude d'Entremont

Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux

Scotia Fundy Inshore Fishermen's Association – Evan Walters

The <45' Shelburne County Fixed Gear Quota Group – Weldon Smith

Pubnico Ledge Fisheries – Frank d'Entremont

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | rebuilding |
| Spawning Biomass: | rebuilding |
| Total Biomass: | rebuilding |
| Recruitment: | moderate/strong year-classes in 1990's; the 1997 year-class estimated to be strong at over 80 million fish |
| Growth and Condition: | increasing trend from 96 to present |
| Age Structure: | expanding |
| Spatial Distribution: | expanding |
| Recent Exploitation Level: | below $F_{0.1}$ |

# COD - 2J3KL

## PERSPECTIVE

The northern cod (NAFO divisions 2J3KL) stock was and potentially remains the largest groundfish resource in the Northwest Atlantic Ocean. The stock inhabits an area of approximately 400,000 square km. Historically, cod in abundance migrated from over-wintering shelf areas to feeding areas in coastal waters. The fishery was traditionally prosecuted by a large fleet of small vessels that deployed traps, gillnets, and hook and line in more coastal waters from late spring to autumn. From the 1960s until the fishing moratorium large otter trawlers prosecuted the fishery in offshore waters, mainly through winter and early spring.

Cod in areas 2J3KL grow relatively slowly and at age five reach about 50 cm (20 inches). Cod prey on a wide variety of species, particularly capelin. The northern cod stock has supported a commercial fishery since the 16th century. In the decades prior to the 1960s catches ranged between 200-300,000 tonnes annually. Catches increased to over 800,000 tonnes in the 1960s and the stock declined until the mid -1970s. After the extension of jurisdiction in 1977, the stock increased until the mid -1980s but has since declined to a very low level. Over-fishing and unfavourable environmental conditions may explain the collapse of the stock that occurred in the early 1990s.

## ANALYSIS

### STOCK STRUCTURE AND DISTRIBUTION

The stock structure of 2J3KL cod changed significantly during the late 1980s and early 1990s. Abundance declined very sharply and the decline continued after the cessation of the commercial fishery in 1992. The distribution of cod reflects a very low abundance in the shelf components and the only concentration of cod is located in the coastal areas of Trinity and Bonavista Bays. Genetic studies suggest that the shelf-spawning components differ from the populations in the coastal area. The populations in the coastal areas are more similar to one another than to the shelf components. The genetic differences are small, and there is inconclusive evidence that they are stable over time. Therefore, the meaning of these differences remains uncertain. **Distribution expansion is key to stock recovery and we must assume that the more sub-components expand, the more likely stock productivity will increase.**

**The FRCC recommends that 2J3KL cod be managed on a long-term basis with the objective of rebuilding the sub-stock structure to include the full range, both in the coastal area and on the shelf, from the northern Grand Bank to the Hamilton Bank.**

The only known large over-wintering and spawning concentration of cod occurs in Smith Sound, Trinity Bay. At present, this aggregation is unique and may be key to the recovery of coastal sub-components and perhaps beyond. Recent acoustic surveys in Smith Sound indicate an average biomass estimate of about 22,000 tonnes. Several year-classes since 1990 are well represented in this aggregation and are similar to those represented in the commercial fishery. Fish spawn in the area (and potentially in other areas) and migrate from the Sound and northward during late spring and summer. These fish return to the Sound in late autumn where they over-winter. Observations from fishers are consistent with this migration pattern.

The FRCC believes that management measures introduced in 1999 were effective in protecting fish aggregated in Smith Sound. However, the small size of the protected area led to a concentration of fishing effort adjacent to the entrance to the Sound.

**The FRCC recommends introduction of a buffer zone of 5 nautical miles around Smith Sound where only local resident fishermen would be permitted to fish.**

Tag returns from the fishery in 1999 were highest in area 3K (26%), lowest in northern 3L (7%), and at an intermediate level in southern 3L (11%). Many of the recoveries of tags applied in southern 3L occurred in 3Ps, suggesting these fish were migrants into 3L.

Figures are in 000t

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 266 | 266 | 256 | 266 | 235 | 199.3 | 190 | | | Moratorium | | | | 4 | 9 |
| Catch | 236.1 | 274.7 | 245 | 268.7 | 254.1 | 233.6 | 155 | 28.3 | 4.1 | 1.3 | 1.7 | 0 | 0.07 | 3.5 | 8.07 |

* Canadian catch as of April 19/00

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

Information from recaptures of cod tagged in 3KL during 1997 through 1999 was used to estimate exploitation rates. When combined with catches recorded for each area, these exploitation rates indicate that cod biomass is approximately 10,000t in 3K and 45,000t in northern 3L. Estimates could not be derived for southern 3L due to the presence of cod from 3Ps.

**The FRCC recommends that the tagging program be expanded to include all stock areas (northern 3K and 2J). In addition, the acoustic surveys in coastal areas should be continued for the foreseeable future. These programs are instrumental in monitoring the status of the coastal components of the northern cod stock.**

DFO conducts bottom trawl surveys each fall on the shelf and Banks of 2J3KL. The abundance index from this survey increased in 1999 from 1998. The increase occurred in 3K and 3L but not in 2J. As in previous years there were very few fish older than 5 years and

## SOURCES

### DFO SCIENCE

SSR A2-01 (2000) Northern(2J3KL) Cod

### FRCC CONSULTATIONS

The FRCC held consultations on this stock in:

Grand Falls, NF (April 18)
Clarenville, NF (April 19)
St. John's, NF (April 20)

### WRITTEN BRIEFS

Thomas Barnes, Fogo Island Fisherman

Aubrey Payne, Fogo Island Fisherman

Fish, Food and Allied Workers – Harvey Jarvis

Wilfred Bartlett, Retired Fisherman, Brighton, NF

3K Small Boat Action Committee – Ray Wimbleton

Hayward Pike, Fisherman, Bonavista Bay

Fish, Food and Allied Workers – Earle McCurdy

Southern Shore Inshore Fishermen's Action Committee – George Chafe

Petty Harbour Fishermen's Co-operative – Tom Best

Fred Winsor

George Feltham

Fisheries Association of Newfoundland and Labrador – Alistair O'Rielly

## COUNCIL'S VIEWS ON STOCK STATUS

| | |
|---|---|
| Overall Stock Indicator: | stock at very low level, some improvement in 1999 |
| Overall biomass: | very low relative to historical levels (3%). Pockets of very high density in coastal areas |
| Recruitment: | some improvement in coastal areas, very low in shelf components |
| Growth and Condition: | growth improving, condition good |
| Age Structure: | very poor in the shelf components (unexplained declines in fish at about age 5), improving in the coastal area, but few fish older than 10 years |
| Distribution: | poor in the shelf and northern coastal areas, improving in coastal 3L |
| Recent Exploitation Level: | unknown in 2J, high in southern 3K, moderate in 3L |

most of the increase was attributed to fish at ages 2 and 3. Overall the biomass index in 1999 was only about 3% of the average in the period 1983 to 1988. The consensus of the industry is that there are very few cod in the shelf components of the stock and the overall level of abundance remains extremely low.

**The FRCC recommends that the moratorium on fishing the shelf and Bank sub-components of 2J3KL continue for the foreseeable future.**

## SENTINEL FISHERY

The sentinel fishery in 2J3KL has been conducted since 1995 to provide an index of cod catch rates in coastal waters. These surveys continue to indicate low catch rates in areas 2J and 3K north. Gillnet catch rates increased from 1995 to 1998 and declined in 1999. Line trawl catch rates remained relatively unchanged in the period 1995 to 1996, increased in 1997, and declined again in 1998 and 1999. The catch rates at age indicate the 1990 and 1992 year-classes to be strongly represented and that year-classes subsequent are weaker. The FFAW in conjunction with fishermen committees conducted a questionnaire, the results of which indicate that the sentinel survey catch rates reflected the observations of fishermen in various areas. Many fishermen (43%) indicated that catch rates were low. These responses were very consistent with the areas where the commercial catches in coastal areas were also low i.e. area 2J, northern 3K, eastern Trinity Bay and Conception Bay, particularly. Other responses from fishers indicated average catch rates (37%), and high catch rates (22%). High catch rate responses reflected sentinel sites in the area from the most eastern coastal part of 3K to the area of Smith Sound in western Trinity Bay. Fishermen noted that there are several important coastal areas where there is inadequate site monitoring and the level of sentinel surveying is declining.

**The FRCC recommends that the sentinel fishery continue and effort be made to expand the number of sites and coverage to ensure the survey is adequate over space and time.**

## BIOLOGICAL FACTORS AND RECRUITMENT

The age at which northern cod reach maturity continues to be low relative to the early 1980's. The proportion of age six cod that are mature currently is about 80%. This is double the level in the 1980's when only about 40% were mature. The size-at-age of cod has increased in recent years and is similar to values in the 1980's. Some 90% of fishermen, as indicated by the FFAW questionnaire results, reported that the overall condition of cod caught during 1999 was good.

A recruitment index was derived from inshore sentinel data as well as other data from offshore and inshore surveys during the period of the 1990's. The index reflects declines from 1989 to1991, an increase in 1994, declines to 1996, and then increases to 1999. The estimates for the most recent years, 1998 and 1999, must be viewed with caution, as their relationship to ultimate year-class strength remains uncertain. It is noteworthy that the dominant 1992 year-class present in the stock structure is not well represented in the recruitment index. The responses from fishermen to the questionnaire as to whether they observed more, the same, or less small (<18 inch) cod in 1999 as compared to 1998, indicated 50% noting more, 34% noting the same, and 16% stating less.

During 1999, the fishery was prosecuted mainly through the deployment of gillnets. The dominant use of this gear type is of concern to the FRCC. Measures should be introduced to provide for a more traditional balance in the use of various gear types in coastal areas.

During 1999, fishing occurred in two seasonal periods. The first was during July (about 3 weeks), and the second season occurred from mid-September to November. This timing is consistent with traditional fishing patterns in the coastal areas of 2J3KL cod. The Council is of the view that fishing should be spread over space and time to the greatest degree possible within the traditional fishing period. The 2J3KL cod stock becomes highly aggregated during winter and through the spring spawning season and in this period is very vulnerable to fisheries. At present the remaining aggregations occur in accessible coastal areas such as Smith Sound and the inner portions of Bonavista Bay. Fishing should be avoided during periods of highest aggregation and spawning.

**The FRCC recommends that cod fishing in coastal 2J3KL take place only during the period June 1 to November 30.**

To the greatest extent possible, juvenile cod should be protected to allow them to surpass spawning age prior to being harvested at a significant level by the fishery.

**The FRCC recommends that the small fish protocol be applied to the 2J3KL cod stock.**

## PREDATION AND PREY

Mortality of northern cod caused by seals continues to be a major concern of the FRCC. Revised consumption estimates for 1998 are approximately 50,000t. Mortality inflicted by "belly-feeding" is not included in these estimates, and continues to be observed in several coastal areas, particularly in Bonavista Bay. Cod over-wintering in coastal areas are very vulnerable to predation mortality, especially given the cold waters which slow cod metabolism and expose them to the risk of freezing if chased into sub-zero temperatures.

During the FRCC's consultations, fishermen continued to express concern with regard to seal predation and many fishermen expressed deep frustration by the lack of action by DFO to address this ongoing problem. Fishermen expressed the view that the ecosystem is out-of-balance, that there are too many seals relative to cod, and that seals are being observed in the coastal area over extended periods of time. Fishermen are frustrated by the lack of scientific information with respect to the impact that seals are having on the recovery of cod. They note that scientists continue to conclude that cod recruitment is generally poor and that cod on the shelf are not living beyond five years, but scientists cannot specify the cause. Fishermen conclude that seals are reducing the spawning potential of the stock. Fishermen are recommending that appropriate steps be taken to authorize the control of seals in limited areas where seals are destroying cod in large numbers.

**The FRCC recommends that areas be identified where cod are aggregated during winter or where seals are inflicting high mortality on cod, and these areas be designated as seal exclusion zones. Within these areas, measures must be taken immediately to protect and conserve cod.**

The FRCC is concerned about ecosystem processes that affect this stock. Oceanographic conditions have warmed considerably in the past few years from the cold years of the early 1990s. However, the trend in biomass of capelin, the major prey of cod in this area, has been uncertain since the late 1980s. The SSR indicates that the tendency for cod to move from the coastal to the Bank regions may be greater if capelin biomass increases both on the shelf and to the north. Recent acoustic surveys have detected several concentrations of capelin in the coastal area but few offshore compared to the period of the 1980s.

Many fishermen expressed similar views on the ecosystem. Most fishermen believe that capelin are at a low level relative to historical times, that elevated numbers of seals may be impacting capelin stocks, and that increases in capelin would enhance the likelihood that cod stocks would increase. In particular, many fishermen believe that the abundances of capelin and cod are intrinsically linked and that cod will only recover when capelin is again abundant in all areas of 2J3KL.

The Council is also concerned about the sub-stock structure of the 2J3KL stock and the impact that uncertainties about this structure are having on current fisheries and rebuilding strategies.

**The FRCC recommends that interactions and relationships between capelin, seals, the physical environment and the sub-stock structure and productivity of 2J3KL cod be better understood. DFO must improve its commitment to science in this regard so that specific information can be provided on the effect that these factors are having on the rebuilding of northern cod.**

## CONCLUSIONS

Historically, the shelf components of the 2J3KL cod stock migrated to the coastal zones in the spring and summer. Indeed, these annual migrations supported the large seasonal coastal fishery and determined the success of the fishery in many bays and inlets along the northeast coast Newfoundland. The rebuilding of these shelf components and a renewed migration are critical to the long-term prosperity of the coastal fishery. Therefore, it is very important that a fishery of any nature consider the possible exploitation on rebuilding shelf sub-components. The recent DFO Stock Status Report states "It is certain that the inshore fishery will not return to its former prominence until such time as a substantial biomass of cod builds up in the offshore and these fish resume a summer feeding migration to the inshore." **The FRCC supports this conclusion and its future recommendations will reflect a sustainable approach that considers the inherent sub-components of the stock.**

The importance of a small vessel coastal fishery and the scientific data provided by it are recognized by the FRCC. The provision of fishery data from fishermen's logbooks on spatial and temporal distribution, catch rates, age and weight of year-classes is an essential element in monitoring and ensuring the rebuilding of this stock. The coastal estimates of abundance from tagging data require tag returns from the fishery. Therefore, the FRCC believes that all fisheries for this stock must contribute to the monitoring of stock status and be of scientific value. The sentinel fishery must continue, but by itself is insufficient to provide monitoring of the full fishery. All stock removals must be utilized to the greatest extent possible in terms of improving knowledge and assisting the rebuilding of this stock.

Fishermen have varying views about the state of the northern cod stock. However, the views expressed overall are consistent with the findings and conclusions provided by scientists in many areas:

- shelf components are very low;
- northern coastal components are also very low;
- catch rates are reasonably good in southern 3K reflecting the presence of coastal fish, however, scientists report that exploitation is high in this area;
- catch rates are high in northern 3L consistent with the relatively large coastal aggregation over-wintering in the area;
- catch rates are highly variable in southern 3L as a consequence of the migration of cod from 3Ps. Scientists were unable to provide an estimate of a resident stock due to the transient presence of cod from the more southern zone in this area.

Fishers are generally of the view that the region from southern 3L to southern 3K can support a commercial fishery at or above the level of 1999. However, this view is not universal.

The FRCC has considered the views of fishermen and the Stock Status Report and recommends that the exploitation of cod in coastal areas be kept low to secure growth in the spawning biomass. The best estimate of the total biomass in coastal 3KL is approximately 55,000t. In addition, it is recognized that a component of fish historically caught in southern 3L were migratory from 3Ps. The best estimate available of the total average biomass of these fish in recent years is approximately 15,000t.

**The FRCC recommends that only sentinel and index fisheries be prosecuted in 3KL. Sentinel fisheries only must be prosecuted in 2J. The total fishing exploitation from all sources in 2J3KL should not exceed a rate of 10%. Therefore, the FRCC recommends that total catch for coastal 2J3KL should not exceed 7,000t.**

**The FRCC also recommends that no more than 80% of the total be taken in northern 3L and 3K (the balance should be harvested in southern 3L). In addition, the FRCC recommends that the migration of cod and allocation between 3Ps and southern 3L be reassessed by DFO, in recognition that historical catches in southern 3L were dependent on migratory fish from 3Ps.**

The "food" fishery in Newfoundland has a very high overall level of effort with participation estimated at about 23,000 vessel days. The harvest potential of this effort is very much impacted by weather and seasonal availability. If continued, this effort could account for up to 15% of the total catch of all fishing at current levels.

**The FRCC supports only those fisheries that return the maximum information to science and management. The 2J3KL "food" fishery does not meet these criteria and therefore should not be continued at the present time.**

The FRCC does not foresee any significant change in the recommended exploitation of this stock until there is significant improvement in stock distribution and abundance, especially in terms of spawning stock and recruitment. It is expected that the strategy of keeping exploitation rates at a low level in the short term will have a pay-off to fishermen and industry within a reasonable time, in terms of higher levels of biomass and harvest. The FRCC believes that allowing higher levels of exploitation in the short term will jeopardize stock rebuilding and the opportunity to re-establish a commercial coastal fishery.

## LONG-TERM PLAN FOR NORTHERN COD

The FRCC is in the process of developing a long-term plan for the rebuilding of the northern cod stock. The plan will set out specific objectives to guide the Council in making recommendations on this stock. Once a draft plan is complete, the Council will be circulating it for public input prior to it being adopted. The plan will seek to establish goals with respect to:

- stock distribution and structure;
- long-term target levels for population growth, biomass and harvest;
- conservation regimes for the stock and its subcomponents;
- the ecosystem in which the stock is a part;
- the time frame upon which rebuilding may occur.

# APPENDIX 1: FRCC MANDATE AND MEMBERSHIP

# FRCC TERMS OF REFERENCE

## 1. INTRODUCTION

The Government of Canada is committed to a more comprehensive approach to the conservation and management of our fisheries resource. This approach demands a better understanding of complex fisheries ecosystems - the interaction of fish with other species, predator-prey relationships, and also changes in the marine environment like ocean currents, water temperatures and salinity.

The Government of Canada is also committed to a more effective role in decision-making for those with practical experience and knowledge in the fishery.

The Minister of Fisheries and Oceans has established the Fisheries Resource Conservation Council (FRCC) as a partnership between government, the scientific community and the direct stakeholders in the fishery. Its mission is to contribute to the management of the Atlantic fisheries on a 'sustainable' basis by ensuring that stock assessments are conducted in a multi-disciplined and integrated fashion and that appropriate methodologies and approaches are employed; by reviewing these assessments together with other relevant information and recommending to the Minister total allowable catches (TACs) and other conservation measures, including some idea of the level of risk and uncertainty associated with these recommendations; and by advising on the appropriate priorities for science.

## 2. DEFINITION OF CONSERVATION

*Fisheries conservation is that aspect of the management of the fisheries resource which ensures that its use is sustainable and which safeguards its ecological processes and genetic diversity for the maintenance of the resource. Fisheries conservation ensures that the fullest sustainable advantage is derived from the resource and that the resource base is maintained.*

## 3. COUNCIL OBJECTIVES

3.1 To help the government achieve its conservation, economic and social objectives for the fishery.The conservation objectives include, but are not restricted to:

  *3.1.1 rebuilding stocks to their 'optimum' levels and thereafter maintaining them at or near these levels, subject to natural fluctuations, and with 'sufficient' spawning biomass to allow a continuing strong production of young fish; and,*

  *3.1.2 managing the pattern of fishing over the sizes and ages present in fish stocks and catching fish of optimal size.*

3.2 To develop a more profound understanding of fish-producing ecosystems including the inter-relationships between species and the effects of changes in the marine environment on stocks.

3.3 To review scientific research, resource assessments and conservation proposals, including, where appropriate, through a process of public hearings.

3.4 To ensure that the operational and economic realities of the fishery, in addition to scientific stock assessments, are taken into account in recommending measures to achieve the conservation objectives.

3.5 To better integrate scientific expertise with the knowledge and experience of all sectors of the industry and thus develop a strong working partnership.

3.6 To provide a mechanism for public and industry advice and review of stock assessment information.

3.7 To make public recommendations to the Minister.

## 4. MANDATE AND SCOPE

4.1 The Fisheries Resource Conservation Council will address these objectives by bringing together industry, DFO science and fisheries management, and external scientific and economic expertise in one body.

4.2 The Council will:

*4.2.1 advise the Minister on research and assessment priorities;*

*4.2.2 review DFO data and advise on methodologies;*

*4.2.3 consider conservation measures that may be required to protect fish stocks;*

*4.2.4 review stock assessment information and conservation proposals, including through public hearings, where appropriate; and,*

*4.2.5 make written public recommendations to the Minister on TACs and other conservation measures.*

4.3 The Council may recommend any measures considered necessary and appropriate for conservation purposes such as TACs, closure of areas to fishing during specific periods, approaches to avoid catching sub-optimal sized fish or unwanted species, and restrictions on the characteristics or use of fishing gears.

4.4 The Council's scope includes Canadian fish stocks of the Atlantic and Eastern Arctic Oceans. In the first instance, the Council will address groundfish, and then subsequently take on responsibility for pelagic and shellfish species.

4.5 The Council may also advise the Minister on Canada's position with respect to straddling and transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO).

## 5. SIZE, STRUCTURE AND MAKE-UP

5.1 The Council will consist of not more than 14 members with an appropriate balance between 'science' and 'industry'.

5.2 Members are chosen on merit and standing in the community, and not as representatives of organizations, areas or interests.

5.3 'Science' members, are drawn from government departments, universities or international posts, and are of an appropriate mix of disciplines, including fisheries management and economics.

5.4 'Industry' members are knowledgeable of fishing and the fishing industry and understand the operational and economic impacts of conservation decisions.

5.5 All members of the Council are appointed by the Minister.

5.6 All members, including the Chairperson, are appointed for a three year term; terms can be renewed.

5.7 Members appointed from DFO serve 'ex officio'.

5.8 Members have to disclose any interest in the Atlantic or Eastern Arctic fishery and take appropriate measures so as to avoid potential or real conflict of interest situations during the term of appointment.

5.9 The four Atlantic Provinces, Quebec and the Northwest Territories may each nominate one delegate to the Council. These delegates have access to the Council's information, and may participate fully in meetings, but will not be asked to officially endorse the formal recommendations to the Minister.

5.10 The Council is supported by a small Secretariat, to be located in Ottawa. The Secretariat will:

*5.10.1 provide administrative support for the functioning of the Council;*

*5.10.2 provide a technical science and fisheries management support;*

*5.10.3 organize Council meetings;*

*5.10.4 record decisions of the Council;*

*5.10.5 undertake a professional communications function for the Council, providing a central point for communications to and from the Council, and*

*5.10.6 undertake such other matters as from time to time might be appropriate.*

5.11 The Chairman may appoint an Executive Committee, consisting of the Chairman, Vice-Chairman, and three other Members.

5.12 In addition, the Chairman may, from time to time, strike an 'ad hoc' committee to deal with a specific issue.

## 6. ACTIVITIES:

6.1 Reviews appropriate DFO science research programs and recommends priorities, objectives and resource requirements.

6.2 Considers scientific information - including biology, and physical and chemical oceanography, taking into account fisheries management, fishing practices, economics and enforcement information.

6.3 Conducts public hearings wherein scientific information is presented and/or proposed conservation measures/options are reviewed and discussed.

6.4 Recommends TACs and other conservation measures.

6.5 Prepares a comprehensive, long-term plan and a work plan for the Council which are reviewed annually at a workshop with international scientists and appropriate industry representatives.

6.6 Ensures an open and effective exchange of information with the fishing industry and contributes to a better public understanding of the conservation and management of Canada's fisheries resource.

# FRCC MEMBERSHIP:

## MEMBERS:

Fred Woodman, Chairman
Jean-Claude Brêthes, Vice-Chair
Osborne Burke
Bill Broderick
Bruce Chapman
Ernest Després
Jean Guy d'Entremont
Gabe Gregory
Frank Hennessey
Dan Lane
Edward McAlduff
John Pope
George Rose
Louis Schofield
Maureen Yeadon

## PROVINCIAL DELEGATES:

Ray Andrews, Nunavut
Yvon Chiasson, New Brunswick
David Gillis, Prince Edward Island
Dario Lemelin, Québec
Tom Dooley, Newfoundland and Labrador
Clary Reardon, Nova Scotia

## EX OFFICIO:

Guy Beaupré
Barry Rashotte
Denis Rivard

## SECRETARIAT:

Michel G. Vermette, Executive Director
Tracey Sheehan
Helena DaCosta
Debra Côté

# FRCC PUBLICATIONS

## FRCC PUBLICATIONS

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|---|---|
| FRCC.2000.R.4 | 2000/2001 conservation requirements for groundfish stocks on Georges Bank and for northern cod. |
| FRCC.2000.R.3 | 2000/2001 Conservation Requirements for Groundfish Stocks in the Gulf of St. Lawrence. |
| FRCC.2000.R.2 | FRCC Advice on Atlantic Halibut for 2000/2001. |
| FRCC.2000.R.1 | 2000 Conservation Requirements for Groundfish Stocks on the Scotian Shelf and in the Bay of Fundy (4VWX), in Sub-areas 0, 2 + 3 (Newfoundland), and Redfish Stocks (January 2000) |
| FRCC.99.R.4 | Fisheries in Transition - Annual Report of the FRCC and Conservation Requirements for Atlantic Groundfish Stocks for 1999 (July 1999) |
| FRCC.99.R.3 | 1999 Conservation Requirements for Cod Stocks in Division 2J3KL (May 1999) |
| FRCC.99.R.2 | 1999 Conservation Requirements for Georges Bank (May 1999) |
| FRCC.99.R.1 | 1999 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in Divisions 2GH and 3Ps and Science Priorities Letter to Minister (April 1999) |
| FRCC.98.R.6 | 1999 Conservation Requirements for Scotian Shelf and Bay of Fundy Groundfish Stocks, Redfish Stocks, Units 1-3 and 3-0, and Groundfish Stocks in Division 3Ps. (November 1998) |
| FRCC.98.R.5 | 1999 Conservation Requirements for Groundfish Stocks Other Than Cod in Sub Area O and Area 2+3 (except 3ps). (October 1998) |
| FRCC.98.R.4 | Georges Bank - 1998, 1998 Conservation Requirements for Georges Bank Groundfish Stocks (May 1998) |
| FRCC.98.R.3 | "Towards an Ecosystem Approach to Fisheries Management", Report of the Environment and Ecology Workshop held at the University of Moncton, Dec. 15-16, 1997 (May/98) |
| FRCC.98.R.2 | Conservation Must Be Compulsory, Not Optional - Annual Report of the FRCC and Conservation Requirements for Atlantic Groundfish Stocks for 1998 (May/98) |
| FRCC.98.R.1 | 1998 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in Division 3Ps and Science Priorities Letter to Minister (Mar/98) |
| FRCC.97.R.7 | 1998 Conservation Requirements for Redfish Units 1, 2, 3 and Division 3-O (Nov/97) |
| FRCC.97.R.6 | 1998 Conservation Requirements for the Scotian Shelf and Bay of Fundy Groundfish Stocks (Nov/97) |
| FRCC.97.R.5 | 1998 Conservation Requirements for Grand Banks, Labrador Shelf and Davis Strait Groundfish Stocks (Oct/97) |
| FRCC.97.R.3 | A Groundfish Conservation Framework for Atlantic Canada (July/97) |
| FRCC.97.R.2 | Georges Bank - 1997 Conservation Requirements for Georges Bank Groundfish Stocks (May/97) |
| FRCC.97.R.1 | A Report on Gear Technology in Eastern Canada Prepared by the Gear Technologies Subcommittee (March/97) |
| FRCC.96.TD.3 | Quota Controls and Effort Controls, Conservation Considerations - A Discussion Paper Prepared by the Management and Regulations Subcommittee (Dec/96)<br>Letter to Stakeholders |

| | |
|---|---|
| FRCC.96.L.2 | Science Priorities Letter to Minister (Dec/96) |
| FRCC.96.R.2 | Building the Bridge - 1997 Conservation Requirements for Atlantic Groundfish (Oct/96) |
| FRCC96.R.1 | Learning from History, Prepared by the Historical Perspective Subcommittee (July/96) |
| FRCC96.TD.2 | From Moratorium to Sustainability: Criteria for Re-Opening and Sustainable Harvesting, with Reference to Cod Stocks in Areas 3Ps, 4TVn and 3Pn4RS Prepared by the Stock Assessment Subcommittee (June/96) |
| FRCC.96.L.1 | Letter to the Minister: Georges Bank Haddock, Cod and Yellowtail Flounder Subarea 5Zjm (May 14/96) |
| FRCC96.TD.1 | Consultation Paper on Gear Technology, Prepared by the Gear Technologies Subcommittee (Jan/96) |
| FRCC.95.R.2 | Conservation Come Aboard - 1996 Conservation Requirements for Atlantic Groundfish (Nov/95) |
| FRCC.95.R.1 | A Conservation Framework for Atlantic Lobster (Nov/95) |
| FRCC.95.L.1 | Letter to the Minister; Georges Bank Haddock and Cod, Subarea 5Zjm (May 19/95) |
| FRCC.94.TD.4 | Conservation Aspects of Groundfish Gear Technologies in Eastern Canada, Prepared by the Gear Technologies Subcommittee (Dec/94) |
| FRCC.94.R.4 | Conservation Stay the Course – 1995 Conservation Requirements for Atlantic Groundfish (Nov/94) |
| FRCC.94.TD.3 | Some Issues Related to Seal-Fisheries Interactions in Eastern Canada, Prepared by the Environmental and Ecology Subcommittee (Sept/94) |
| FRCC.94.TD.2 | Report to the Minister on Other Conservation Measures (Sept/94) |
| FRCC.94.TD.1 | Considerations on How to Re-Open a Closed Fishery, Prepared by the Stock Assessment Subcommittee (1994, 1995) |
| FRCC.94.R.3 | Report to the Minister of Fisheries and Oceans on Greenland Halibut (Turbot) in NAFO Subareas 0, 1, 2 and 3 (June 20/94) |
| FRCC.94.L.1 | Letter to Minister regarding Science Priorities (Jan/94) |
| FRCC.93.R.2 | Partners in Re-building Fish Stocks for our Future - 1994 Conservation Requirements for Atlantic Groundfish (Nov. 29,/93) |
| FRCC.93.R.1 | We Must Stop Chasing Quotas Down to the Last Fish - 1993 Conservation Requirements for Atlantic Groundfish (Aug/93) |
| FRCC.93.L.1 | Letter to Minister regarding Silver Hake (August 23/93) Letters to Minister regarding NAFO (1993, 1994, 1996 ) |

# 200 MILE FISHING ZONE AND NAFO FISHING BOUNDARIES